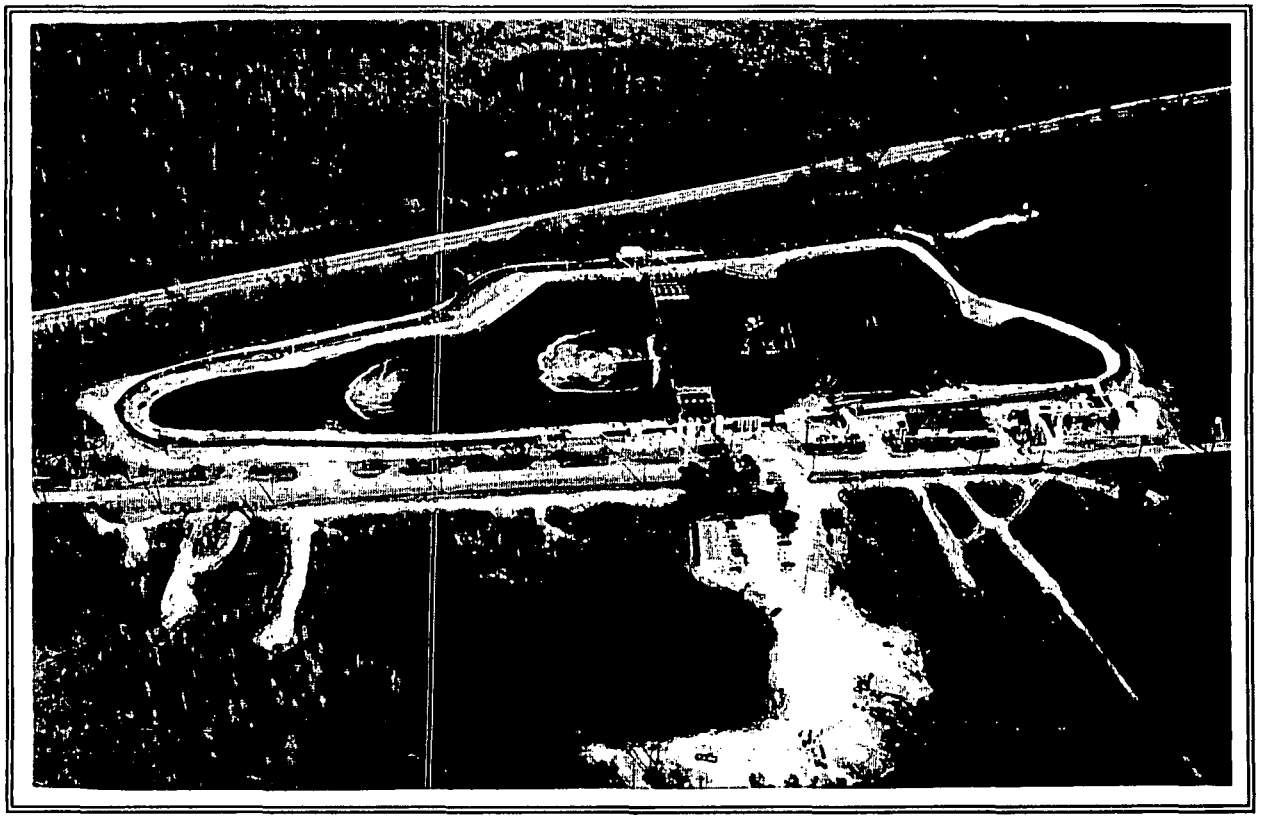
# French Ltd. Project

FLTG, Inc.
Crosby, Texas

## MONTHLY PROGRESS REPORT



Submitted to:

U.S. Environmental Protection Agency - Region 6
and
Texas Water Commission

March, 1994

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Appendix A - None

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Appendix C - Analytical Results -
Samples dated March 1 - March 31, 1994

| Project I.D. | Date Received | Project I.D. | Date Received |
|---|---|---|---|
| M03A0209 | 3/07/94 | S19F0001 | 3/18/94 |
| S14L0015 | 3/07/94 | M01D0038 | 3/18/94 |
| S19E0003 | 3/07/94 | M03A0214 | 3/21/94 |
| M03A0210 | 3/09/94 | M03A0215 | 3/21/94 |
| S14A0063 | 3/09/94 | M03A0216 | 3/21/94 |
| S17H0002 | 3/09/94 | M06C0014 | 3/21/94 |
| M03A0206 | 3/10/94 | S14A0065 | 3/21/94 |
| S14A0064 | 3/10/94 | S19C0003 | 3/21/94 |
| S14D0002 | 3/10/94 | S19A0003 | 3/25/94 |
| M03A0211 | 3/11/94 | S19A0004 | 3/25/94 |
| M03A0212 | 3/11/94 | S19A0005 | 3/25/94 |
| M03A0213 | 3/11/94 | M03A0217 | 3/28/94 |
| S19B0005 | 3/11/94 | S14A0066 | 3/28/94 |
| M08A0013 | 3/18/94 | S14A0067 | 3/28/94 |
| S14J0004 | 3/18/94 | S16F0042 | 3/28/94 |
| S14L0016 | 3/18/94 | S17H0003 | 3/31/94 |

Appendix D - FLTG Operator Logs
- FLTG Sample Technician Logs
- Cumulative Groundwater Flowmeter Data
- FLTG Dredge Operator Logs

# 1.0 INTRODUCTION

This report covers the activities of FLTG, Inc. and the French Limited Project for March, 1994. FLTG, Inc. manages the project for the French Limited Task Group of Potentially Responsible Parties.

During March, 1994, the project team focused on the following activities and issues:

- Health, Safety, and Quality
- Safety awareness.
- Contractor safety.
- HAZOP of daily work assignments.
- Detecting and correcting work place hazards.
- Response to changing site conditions.
- Safety aspects of residue stabilization.
- Safe lifting procedures.
- Slipping, tripping, and falling hazards.
- Safe work practices in congested conditions.
- Treatment of Cell D/F water to meet effluent specifications.
- Backfill Cell F.
- Maintain DO, OUR, HMB, and plate count in Cell F.
- Stabilize biomass in Cell E.

- Operation and maintenance of the aquifer remediation system.
- In-situ aquifer bioremediation.
- DNAPL response options.
- Layout and design INT-11 area containment.
- RFP for INT-11 area containment.
- Water treatment plant operation and maintenance.
- Management of carbon blending system to minimize carbon consumption.
- Water treatment plant sludge handling to Cell D.
- Operation of the data base management system.
- Identification and evaluation of potential wetlands sites.

This report includes:

- A summary of March activities, issues, and progress.
- Lagoon Demobilization activities, issues, and progress.
- Groundwater and Subsoil Remediation activities, issues, and progress.
- Groundwater Treatment Plant activities, issues, and progress.
- Ambient Air Management status.
- QA/QC status and data.
- Site management activities, issues, and progress.
- Wetlands restoration status.

# 2.0 SUMMARY

## 2.1 Summary of Activities and Progress

### 2.1.1 Health and Safety

There were no personal injury or equipment damage incidents.

Conducted safety meetings and job inspections at the start of each shift; reviewed safety issues before starting all jobs.

Conducted daily mini-HAZOP of all specific jobs.

Supervision made 384 specific on-the-job safety contacts.

Emphasized hand and body pinch points.

Emphasized slips, trips, and falls.

All employees and contractors attended daily safety meetings.

Reviewed hazards associated with wet and cold weather.

Reviewed hazards associated with changing conditions.

Reviewed personal protective equipment requirements with all site workers.

Inspected and certified all fire extinguishers.

Conducted specific fire extinguisher use training.

Inspected all contractor equipment before on-site use.

Inspected all vendor delivery trucks before site entry.

Conducted 30 specific health and safety inspections.

Documented site health and safety inspections; conducted follow-up inspections.

Logged all safety issues each shift; less than 24-hour response to all safety issues.

Continued lottery ticket daily safety awareness incentive program; all regular site employees receive a Texas lottery ticket each day; tickets can be "lost" due to safety violations; employee response has been excellent.

Conducted personnel exposure monitoring, and all results were within acceptable levels. The most recent results are in Table 2-1.

Updated employee training records.

### 2.1.2 Quality/QAQC/Data Base Management

The total quality process was used. The status of the goals is shown on Table 2-2. The safety, health, security, ambient air management, migration control, aquifer remediation, lagoon remediation, analytical cost, and overtime goals were met.

The technical support MH goal was exceeded due to additional pumping and injection wells and design of INT-11 area containment.

Backfill was prevented on 11 days due to wet weather.

Raw data is being validated as per the plan.

The data base management system operated full on-line with no major problems or delays.

There were no data or reports rejected due to errors.

Selected American Analytical for project analytical work based on responsiveness and commercial terms.

### 2.1.3 Lagoon Remediation

Dismantling and decontamination of lagoon equipment and systems on the South side is complete, except for the dredges and the work boat.

Maintained a high level of biological activity in Cell D/F; OUR, HMB, and plate counts are high. Added $O_2$ to Cell D/F using downdraft aerators.

Installed sheetpile to isolate Cell D from Cell F, so Cell D can be used to store and treat water treatment plant biomass.

The Lefco unit treated and discharged about 3.1 million gallons of water; the Lefco unit operated with a minimum of problems.

About 12,200 cubic yards of backfill were placed in Cell F.

Stabilized the biomass in the NE corner of Cell E.

Revised lagoon demobilization plan in response to EPA and TNRCC comments.

Started interim grading and topsoil placement in Cell E.

Continued on-call schedule and specific procedures to close the west end floodwall access in the event of a flood.

### 2.1.4 Ambient Air Management

Ambient air quality was manually checked daily with portable analyzers, and no response action was required.

Time-integrated samples were collected in three work areas, and the results indicated no exposure; the data is shown in Table 2-1.

### 2.1.5 Aquifer Remediation

Monitored status of DNAPL plumes.

DNAPL flow to S1-13 and S1-16 is erratic; S1-12 showed low levels of DNAPL.

Direct drive pump in S1-16 continued to perform well.

Discussed DNAPL remedial response objectives and criteria with EPA and TNRCC.

Developed responses to agency comments on the DNAPL risk assessment.

Continued to develop and evaluate DNAPL response options.

Completed layout, design, and specifications for the INT-11 area containment wall.

Continued routine S1 and INT oxygen and nutrient injection; continued to improved the measurement and control of nutrient additions.

Issued weekly well status and performance reports.

Inspected and adjusted all wells each day.

Continued daily maintenance of recovery and injection wells.

Chlorinated six production wells to decrease the biomass build up and to increase well flow, and the results were very positive.

Removed silt buildup from six wells to increase well flow.

Developing a plan to redevelop persistent low flow wells.

Biomonitoring continued to indicate an active and diverse in-situ biological system.

Completed quarterly well measurements and sampling.

Awarded contracts for bid for cone penetrometer work (Terra Tech), and for well installation/development (Layne).

Started installation of additional monitoring, injection, and pumping wells in selected INT and S1 areas to expedite the in-situ bioremediation.

Maintained $O_2$ content of injection water at about 30-40 ppm.

Expanded the pulse pumping area in sections of the S1 zone South of Gulf Pump Road; the results continue to look positive.

### 2.1.6 Groundwater Treatment

All discharge criteria were met (see Table 2-3).

The revised discharge criteria was approved.

The carbon blending system was put on line and operated with no problems.

The carbon absorbers were flushed and recharged on one occasion.

The water treatment plant operated 97% of the time; most of the downtime was due to the carbon change.

The in-line filters on the discharge lines from the bioreactors continue to be effective in removing media pieces.

TOC input to T-101 continued to decrease as the flows from the wells inside the floodwall decreased.

TOC reduction through the Water Treatment Plant has responded to the variations in input TOC; TOC reduction through the bioreactors increased as the biomass diversified.

Biological cultures developed from the lagoon biomass continue to work well in the reactors.

The process operators collected all the process water and ground water samples.

### 2.1.7 Wetlands Restoration

Completed conceptual design and costs for four potential sites.

Reviewed site evaluation process and results with the agency review committee.

Completed archeology, hydrology, and contaminant studies of the two final sites.

Recommended the Brownwood site.

### 2.1.8 Site Management and Issues

Used the on-site laboratory to process all the operational control samples.

Reviewed lagoon and aquifer progress and plans in detail with EPA and TWC on a regular basis.

Continued equipment salvage and sales.

Reviewed project status and issues each day to ensure focus on critical issues - safety, quality and cost.

Issued weekly cost, schedule, and maintenance reports.

Reviewed progress on issues and action plans each week.

Reduced technical support MH's.

Tested the flood gate on one occasion.

Final results on fish tissue samples from the North fishing hole and from Riverdale lake were issued; the results indicate no high levels.

## TABLE 2-1

### Ambient Air Management
### Time Integrated Exposure Data

| Compound | PEL 8 hour PPM | M01D0038 10-Mar-94 Inside Wall | | M01D0038 10-Mar-94 Outside Wall | | M01D0038 10-Mar-94 Demob. Oper. | |
|---|---|---|---|---|---|---|---|
| | | % of PEL | PPM | % of PEL | PPM | % of PEL | PPM |
| Chloromethane | 50 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bromomethane | 5 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Vinyl chloride | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Chloroethane | 1000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Dichloromethane | 50 | 0.000 | 0.000 | 0.002 | 0.001 | 0.004 | 0.002 |
| Acetone | 750 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Carbon disulfide | 10 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1,1-Dichloroethene | 5 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1,1-Dichloroethane | 100 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| trans-1,2-Dichloroethene | 200 | 0.000 | 0.000 | 0.001 | 0.002 | 0.000 | 0.000 |
| Chloroform | 10 | 0.011 | 0.001 | 0.224 | 0.022 | 0.012 | 0.001 |
| 1,2-Dichloroethane | 10 | 0.011 | 0.001 | 0.045 | 0.004 | 0.011 | 0.001 |
| 2-Butanone | 200 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1,1,1-Trichloroethane | 350 | 0.000 | 0.000 | 0.004 | 0.012 | 0.001 | 0.002 |
| Carbon Tetrachloride | 5 | 0.006 | 0.000 | 0.057 | 0.003 | 0.000 | 0.000 |
| Vinyl acetate | 10 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bromodichloromethane | | | 0.000 | | 0.000 | | 0.000 |
| 1,2-Dichloropropane | 75 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| cis-1,3-Dichloropropene | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Trichloroethene | 50 | 0.000 | 0.000 | 0.009 | 0.004 | 0.000 | 0.000 |
| Dibromochloromethane | | | 0.000 | | 0.000 | | 0.000 |
| 1,1,2-Trichloroethane | 10 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 0.001 |
| Benzene | 1 | 0.265 | 0.003 | 0.134 | 0.001 | 0.547 | 0.005 |
| trans-1,3-Dichloropropene | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2-Chloroethylvinyl ether | | | 0.000 | | 0.000 | | 0.000 |
| Bromoform | 0.5 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 4-Methyl-2-pentanone | 50 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2-Hexanone | 5 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tetrachloroethene | 50 | 0.001 | 0.000 | 0.022 | 0.011 | 0.001 | 0.001 |
| 1,1,2,2-Tetrachloroethane | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Toluene | 100 | 0.004 | 0.004 | 0.002 | 0.002 | 0.012 | 0.012 |
| Chlorobenzene | 10 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ethylbenzene | 100 | 0.001 | 0.001 | 0.001 | 0.001 | 0.003 | 0.003 |
| Styrene | 50 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Xylene (total) | 100 | 0.003 | 0.003 | 0.002 | 0.002 | 0.013 | 0.013 |
| Hexane | | | 0.002 | | 0.009 | | 0.016 |

## TABLE 2-2

### Project Quality

| Status as of 3/31/94 | Goals | | |
|---|---|---|---|
| Yes | 1) | No OSHA recordable injuries. | |
| Attention | 2) | 100% compliance with all safety rules and procedures. | |
| Yes | 3) | No citations for violations of applicable, relevant and appropriate regulations. | |
| Yes | 4) | 100% attendance (including subcontractors) at daily safety meetings. | |
| Attention | 5) | Less than 24-hour response time on health and safety issues. | |
| Yes | 6) | 100% sign-in and security clearance. | |
| Yes | 7) | No invalidation of reported data due to QA/QC issues. | |
| | 8) | Spend less than: | |
| | | | MH/Month |
| Yes | | • Direct hire | 3,000 |
| Yes | | • FLTG management (5 people) | 700 |
| Attention | | • Technical support (5 people) | 900 |
| Yes | | • Maintenance support | 120 |
| Attention | 9) | Pump at least 140 gpm; inject at least 100 gpm. | |
| Attention | 10) | Remediate shallow alluvial zone aquifer in 60 months. | |
| Action | 11) | Pump and treat 3.8 million gallons of lagoon water per month. | |
| Action | 12) | Place 30,000 yds.$^3$ of fill in the lagoon per month. | |
| Yes | 13) | Hold analytical cost to less than $20,000 per month (1994 only). | |
| Yes | 14) | No unscheduled overtime (per day or per week). | |
| Yes | 15) | No agency contacts which require 3rd party resolution. | |
| Yes | 16) | Documented training of site personnel for all work assignments. | |
| Yes | 17) | Weekly audit of actual performance versus goals. | |

## TABLE 2-3
### Treated Water Results Summary

| Collected | Set No. | pH (6-9) | | TSS 5 PPM | | TOC 55 PPM | | O&G 15 PPM | | Benzene 150 PPB | | Chlor HC's 500 PPB | | Total PCBs 0.65 PPB | | Napthalene 300 PPB | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Daily | R Avg | Daily | R Avg | Daily | R Avg | Daily | R Avg | Daily | R Avg | Daily | R Avg | Daily | R Avg | Daily | R Avg |
| 2 Dec 93 | M03A0189 | 7.61 | | 1. | | 10. | | 2.15 | | 2.5 | | 14. | | 1.5 | | 5. | |
| 6 Dec 93 | M03A0190 | 7.99 | | 1. | | 5. | | 2.15 | | 2.5 | | 4. | | .25 | | 5. | |
| 9 Dec 93 | M03A0191 | 7.63 | | 1. | | 5.1 | | 2.15 | | 2.5 | | 8. | | 1.5 | | 5. | |
| 13 Dec 93 | M03A0192 | 7.5 | | 2. | | 13.3 | | 2.15 | | 2.5 | | 4. | | .25 | | 5. | |
| 16 Dec 93 | M03A0193 | 7.58 | | 2. | | 15. | | 2.15 | | 2.5 | | 50. | | .13 | | 5. | |
| 20 Dec 93 | M03A0194 | 8.13 | | 1.1 | | 1.4 | | 2.15 | | 2.5 | | 50. | | .13 | | 5. | |
| 23 Dec 93 | M03A0195 | 7.82 | | 1. | | 1.8 | | 2.95 | | 2.5 | | 50. | | .13 | | 5. | |
| 27 Dec 93 | M03A0196 | 7.63 | | 1. | | 6.7 | | 2.15 | | 2.5 | | 50. | | .13 | | 5. | |
| 31 Dec 93 | M03A0197 | 7.98 | 7.77 | 1.1 | 1.24 | .5 | 6.03 | 2.3 | 2.32 | 2.5 | 2.5 | 50. | 31.11 | .13 | .15 | 5. | 5. |
| 3 Jan 94 | M03A0198 | 7.8 | 7.78 | 1. | 1.24 | 4.7 | 5.44 | 2.8 | 2.33 | 2.5 | 2.5 | 50. | 35.11 | .13 | .15 | 5. | 5. |
| 6 Jan 94 | M03A0199 | 7.78 | 7.76 | 1. | 1.24 | .5 | 5.44 | 2.65 | 2.38 | 2.5 | 2.5 | 50. | 40.22 | .13 | .14 | 5. | 5. |
| 10 Jan 94 | M03A0200 | 8.21 | 7.83 | 2. | 1.36 | 4.2 | 5.34 | 2.15 | 2.38 | 2.5 | 2.5 | 50. | 44.89 | .13 | .14 | 5. | 5. |
| 13 Jan 94 | M03A0201 | 8.17 | 7.9 | 4. | 1.58 | 7.9 | 4.74 | 2.8 | 2.46 | 2.5 | 2.5 | 50. | 50. | .13 | .13 | 5. | 5. |
| 17 Jan 94 | M03A0203 | 7.79 | 7.92 | 1.05 | 1.47 | 9. | 4.08 | 2.7 | 2.52 | 2.5 | 2.5 | 8. | 45.33 | .13 | .13 | 5. | 5. |
| 20 Jan 94 | M03A0202 | 7.75 | 7.88 | 1. | 1.46 | 6.1 | 4.6 | 2.7 | 2.58 | 2.5 | 2.5 | 8. | 40.67 | .13 | .13 | 5. | 5. |
| 24 Jan 94 | M03A0204 | 7.6 | 7.86 | 2. | 1.57 | 12. | 5.73 | 2.7 | 2.55 | 2.5 | 2.5 | 19. | 37.22 | .13 | .13 | 5. | 5. |
| 27-Jan-94 | M03A0205 | 7.5 | 7.84 | 1. | 1.57 | 11. | 6.21 | 2.7 | 2.61 | 2.5 | 2.5 | 16. | 33.44 | .13 | .13 | 5. | 5. |
| 31-Jan-94 | M03A0206 | 8.02 | 7.85 | 2.1 | 1.68 | 6.2 | 6.84 | 2.8 | 2.67 | 2.5 | 2.5 | 50. | 33.44 | .13 | .13 | 5. | 5. |
| 3-Feb-94 | M03A0207 | 7.6 | 7.82 | 1. | 1.68 | 3.8 | 6.74 | 2.8 | 2.67 | 2.5 | 2.5 | 26. | 30.78 | .13 | .13 | 5. | 5. |
| 7-Feb-94 | M03A0208 | 7.57 | 7.8 | 1.1 | 1.69 | 12. | 8.02 | 2.15 | 2.61 | 2.5 | 2.5 | 19. | 27.33 | .13 | .13 | 5. | 5. |
| 10 Feb 94 | M03A0209 | 7.98 | 7.78 | 2. | 1.69 | 9.7 | 8.63 | 2.8 | 2.68 | 2.5 | 2.5 | 45. | 26.78 | .13 | .13 | 5. | 5. |
| 14 Feb-94 | M03A0210 | 8.04 | 7.76 | 1. | 1.36 | 3.8 | 8.18 | 2.8 | 2.68 | 2.5 | 2.5 | 37. | 25.33 | .13 | .13 | 5. | 5. |
| 17-Feb 94 | M03A0211 | 7.87 | 7.77 | 2. | 1.47 | 4.2 | 7.64 | 2.15 | 2.62 | 2.5 | 2.5 | 15. | 26.11 | .13 | .13 | 5. | 5. |
| 21-Feb-94 | M03A0212 | 7.53 | 7.75 | 1. | 1.47 | 8.6 | 7.92 | 2.15 | 2.56 | 2.5 | 2.5 | 21. | 27.56 | .13 | .13 | 5. | 5. |
| 24-Feb-94 | M03A0213 | 8.14 | 7.81 | 2.2 | 1.49 | 4. | 7.03 | 2.8 | 2.57 | 2.5 | 2.5 | 19. | 27.56 | .13 | .13 | 5. | 5. |
| 28-Feb-94 | M03A0214 | 7.94 | 7.85 | 1. | 1.49 | 4.8 | 6.34 | 2.8 | 2.58 | 2.5 | 2.5 | 19. | 27.89 | .13 | .13 | 5. | 5. |
| 3 Mar-94 | M03A0215 | 7.62 | 7.81 | 1. | 1.37 | 8.1 | 6.56 | 2.8 | 2.58 | 2.5 | 2.5 | 50. | 27.89 | .13 | .13 | 5. | 5. |
| 7-Mar 94 | M03A0216 | 7.78 | 7.83 | 1. | 1.37 | 10. | 7.24 | 2.15 | 2.51 | 2.5 | 2.5 | 105. | 36.67 | .13 | .13 | 5. | 5. |
| 10 Mar-94 | M03A0217 | 7.73 | 7.85 | 2. | 1.47 | 17. | 7.8 | 2.7 | 2.57 | 2.5 | 2.5 | 122. | 48.11 | .13 | .13 | 5. | 5. |
| 14-Mar-94 | M03A0218 | 7.87 | 7.84 | 2. | 1.47 | 3.3 | 7.09 | 2.8 | 2.57 | 2.5 | 2.5 | 26. | 46. | .13 | .13 | 5. | 5. |
| 17-Mar-94 | M03A0219 | 7.75 | 7.8 | 1. | 1.47 | .5 | 6.72 | 2.8 | 2.57 | 2.5 | 2.5 | 14. | 43.44 | .13 | .13 | 5. | 5. |
| 21-Mar-94 | M03A0220 | 7.87 | 7.8 | 4.2 | 1.71 | 18. | 8.26 | 2.8 | 2.64 | 2.5 | 2.5 | 243. | 68.78 | .13 | .13 | 5. | 5. |
| 24-Mar-94 | M03A0221 | 7.52 | 7.8 | 2. | 1.82 | 20.2 | 9.54 | 2.95 | 2.73 | 2.5 | 2.5 | 78. | 75.11 | .13 | .13 | 5. | 5. |
| 28 Mar-94 | M03A0222 | 8. | 7.79 | 1. | 1.69 | 10. | 10.21 | 2.8 | 2.73 | 2.5 | 2.5 | 98. | 83.89 | .13 | .13 | 5. | 5. |
| 31-Mar-94 | M03A0223 | 7.93 | 7.79 | | | | | | | | | | | | | | |

## TABLE 2-3 (Continued)
## Treated Water Results Summary

| Collected | Set No. | As | | Ba | | Cd | | Cr | | Cu | | Pb | | Mn | | Hg | | Ni | | Se | | Ag | | Zn | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 150 PPB | | 200 PPB | | 50 PPB | | 500 PPB | | 15 PPB | | 66 PPB | | 300 PPB | | 1 PPB | | 148 PPB | | 20 PPB | | 5 PPB | | 162 PPB | |
| | | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | -Av | Daily | -Av | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | R-Av | Daily | R-Avg |
| 2 Dec-93 | M03A0189 | 13.4 | | 8.3 | | 2. | | 3. | | 4.7 | | 17. | | 9.3 | | .1 | | 7.5 | | 1.5 | | 2. | | 25. | |
| 6 Dec-93 | M03A0190 | 11.9 | | 18. | | 2. | | 3. | | 2. | | 17. | | 24.4 | | .1 | | 7.5 | | 1.5 | | 2. | | 16. | |
| 9 Dec 93 | M03A0191 | 9.6 | | 17.6 | | 2. | | 3. | | 2. | | 17. | | 19.3 | | .1 | | 7.5 | | 1.5 | | 2. | | 12.4 | |
| 13 Dec-93 | M03A0192 | 7.6 | | 15. | | 2 | | 3. | | 2. | | 17. | | 19. | | .1 | | 7.5 | | 1.5 | | 2. | | 7.6 | |
| 16 Dec 93 | M03A0193 | 14.2 | | 20.5 | | 2. | | 3. | | 2. | | 17. | | 22.7 | | .1 | | 7.5 | | 1.5 | | 2. | | 12. | |
| 20 Dec-93 | M03A0194 | 14. | | 5.7 | | 2. | | 3. | | 2. | | 17. | | 4.5 | | .1 | | 7.5 | | 1.5 | | 2. | | 17.8 | |
| 23 Dec-93 | M03A0195 | 11.1 | | 14. | | 2. | | 3. | | 2. | | 17. | | 12.6 | | .1 | | 7.5 | | 3.5 | | 2. | | 19.9 | |
| 27-Dec-93 | M03A0196 | 12 8 | | 19.3 | | 2. | | 3. | | 2. | | 17. | | 15.3 | | .1 | | 7.5 | | 3.2 | | 2. | | 22.5 | |
| 31 Dec-93 | M03A0197 | 20 7 | 12.8 | 22.3 | 15 6 | 2. | 2. | 3. | 3. | 2. | 2.3 | 17. | 17. | 17.1 | 16. | .1 | .1 | 7.5 | 7.5 | 3.5 | 2.1 | 2. | 2. | 13.6 | 16.3 |
| 3 Jan-94 | M03A0198 | 9.7 | 12.4 | 18.7 | 16.8 | 2. | 2. | 3. | 3. | 2. | 2. | 17. | 17. | 17.5 | 16.9 | .1 | .1 | 7.5 | 7.5 | 1.5 | 2.1 | 2. | 2. | 13.5 | 15. |
| 6 Jan 94 | M03A0199 | 17.3 | 13. | 17. | 16.7 | 2. | 2. | 3. | 3. | 2. | 2. | 17. | 17. | 21.3 | 16.6 | .1 | .1 | 7.5 | 7.5 | 1.5 | 2.1 | 2. | 2. | 17.6 | 15.2 |
| 10 Jan-94 | M03A0200 | 15.9 | 13.7 | 13.3 | 16.2 | 2. | 2 | 3. | 3. | 2. | 2. | 17. | 17. | 13.8 | 16. | .1 | .1 | 7.5 | 7.5 | 1.5 | 2.1 | 2. | 2. | 23. | 16.4 |
| 13 Jan-94 | M03A0201 | 10.8 | 14 1 | 8.8 | 15.5 | 2.5 | 2.1 | 2. | 2.9 | 2.5 | 2.1 | 21. | 17.4 | 12 3 | 15.2 | .1 | .1 | 9.5 | 7.7 | 3 4 | 2 3 | 2. | 2. | 27 9 | 18 6 |
| 17 Jan-94 | M03A0203 | 7.4 | 13.3 | 15.3 | 14.9 | 2.5 | 2.1 | 2. | 2 8 | 2.5 | 2.1 | 21. | 17.9 | 15.2 | 14.4 | .1 | .1 | 9.5 | 7.9 | 1.5 | 2.3 | 2. | 2. | 21 2 | 19.7 |
| 20 Jan 94 | M03A0202 | 10.9 | 13. | 12.1 | 15.6 | 2.5 | 2 2 | 2. | 2.7 | 2.5 | 2.2 | 21. | 18.3 | 14.8 | 15.5 | .1 | .1 | 9.5 | 8.2 | 1.5 | 2.3 | 2. | 2. | 15 6 | 19.4 |
| 24 Jan 94 | M03A0204 | 10. | 12.8 | 13.2 | 15.6 | 2.5 | 2 2 | 2. | 2.6 | 2.5 | 2.2 | 21. | 18.8 | 22.9 | 16.7 | .1 | .1 | 9.5 | 8 4 | 1.5 | 2.1 | 2. | 2. | 24 4 | 19.9 |
| 27 Jan 94 | M03A0205 | 11.2 | 12.7 | 10. | 14.5 | 2.5 | 2 3 | 3.5 | 2.6 | 2.5 | 2.3 | 21. | 19.2 | 24. | 17.7 | .1 | .1 | 9.5 | 8.6 | 1.5 | 1.9 | 2. | 2 | 30 | 20 8 |
| 31 Jan-94 | M03A0206 | 17 6 | 12.3 | 12. | 13.4 | 2.5 | 2 3 | 3.5 | 2 7 | 2.5 | 2.3 | 21. | 19.7 | 17. | 17.6 | .1 | .1 | 9.5 | 8.8 | 1.5 | 1.7 | 2. | 2. | 32. | 22.8 |
| 3-Feb 94 | M03A0207 | 11.8 | 12.5 | 16.4 | 13.1 | 2.5 | 2.4 | 3.5 | 2.7 | 2.5 | 2.4 | 21. | 20.1 | 22.5 | 18.2 | .1 | .1 | 9.5 | 9.1 | .5 | 1.6 | 2. | 2. | 28.2 | 24 4 |
| 7-Feb-94 | M03A0208 | 9.9 | 11.7 | 17.1 | 13.1 | 2.5 | 2 4 | 2. | 2.6 | 2.5 | 2.4 | 21. | 20.6 | 25.7 | 18.7 | .1 | .1 | 9.5 | 9.3 | 1.5 | 1.6 | 1.5 | 1.9 | 39. | 24 6 |
| 10 Feb 94 | M03A0209 | 9.3 | 11. | 11.6 | 12.9 | 2.5 | 2.5 | 2 | 2.5 | 2.5 | 2.5 | 21. | 21. | 11.6 | 18.4 | .1 | .1 | 9.5 | 9.5 | 1.5 | 1.6 | 1.5 | 1.9 | 18.4 | 24.1 |
| 14 Feb-94 | M03A0210 | 8.7 | 10 8 | 9.8 | 13.1 | 2.5 | 2.5 | 2. | 2.5 | 2.5 | 2.5 | 21. | 21. | 9.1 | 18.1 | .1 | .1 | 9.5 | 9.5 | 1.5 | 1.4 | 1.5 | 1.8 | 12.8 | 22.4 |
| 17 Feb-94 | M03A0211 | 13.4 | 11.4 | 10.1 | 12.5 | 2.5 | 2.5 | 2. | 2.5 | 2.5 | 2.5 | 21. | 21. | 24.1 | 19.1 | .1 | .1 | 9.5 | 9.5 | 1.5 | 1.4 | 1.5 | 1.8 | 11.2 | 21.3 |
| 21 Feb 94 | M03A0212 | 11.1 | 11.4 | 19.4 | 13.3 | 2.5 | 2.5 | 2. | 2.5 | 2.5 | 2.5 | 21. | 21. | 24.6 | 20.2 | .1 | .1 | 22. | 10.9 | 1.5 | 1.4 | 1.5 | 1.7 | 24.8 | 22.3 |
| 24 Feb-94 | M03A0213 | 12.1 | 11.7 | 8.8 | 12.8 | 2.5 | 2.5 | 2. | 2.5 | 2.5 | 2.5 | 21. | 21. | 5. | 18.2 | .1 | .1 | 9.5 | 10.9 | 1.5 | 1.4 | 1.5 | 1.7 | 20.2 | 21.8 |
| 28 Feb-94 | M03A0214 | 8.8 | 11.4 | 10.8 | 12.9 | 2.5 | 2.5 | 2. | 2.3 | 2.5 | 2.5 | 21. | 21. | 12.2 | 16.9 | .1 | .1 | 9.5 | 10.9 | .5 | 1.3 | 1.5 | 1.6 | 18 8 | 20.6 |
| 3-Mar 94 | M03A0215 | 8.4 | 10.4 | 20.6 | 13.8 | 2.5 | 2.5 | 2. | 2 2 | 2. | 2.4 | 21. | 21. | 27.5 | 18. | .1 | .1 | 9.5 | 10.9 | .5 | 1.2 | 1.5 | 1.6 | 14.4 | 18.6 |
| 7-Mar 94 | M03A0216 | 10. | 10.2 | 21.7 | 14 4 | 2.5 | 2.5 | 2. | 2. | 2.5 | 2.4 | 21. | 21. | 20.8 | 17.8 | .1 | .1 | 9.5 | 10.9 | .5 | 1.2 | 1.5 | 1.5 | 20 3 | 17.8 |
| 10-Mar-94 | M03A0217 | 8.2 | 10. | 25.6 | 15.4 | 2.5 | 2.5 | 2. | 2. | 2 5 | 2.4 | 20.5 | 20.9 | 20.8 | 17.3 | .1 | 1 | 9.5 | 10.9 | .5 | 1.1 | 1.5 | 1.5 | 10 4 | 16 8 |
| 14 Mar-94 | M03A0218 | 7.1 | 9 8 | 30.3 | 17.5 | 2.5 | 2.5 | 2. | 2. | 2.5 | 2.4 | 20.5 | 20.9 | 8.4 | 16.9 | .1 | .1 | 9.5 | 10.9 | .5 | .9 | 1.5 | 1.5 | 17.9 | 16.8 |
| 17-Mar-94 | M03A0219 | 9.4 | 9.8 | 39. | 20.7 | 2.5 | 2.5 | 2. | 2. | 2.5 | 2.4 | 20.5 | 20.8 | 7.3 | 16.7 | .1 | .1 | 9.5 | 10.9 | .5 | .8 | 1.5 | 1.5 | 13.3 | 16 8 |
| 21-Mar 94 | M03A0220 | 12 2 | 9.7 | 31. | 23. | 2.5 | 2.5 | 2. | 2. | 2.5 | 2.4 | 20.5 | 20.8 | 32.3 | 17.7 | .1 | .1 | 9.5 | 10.9 | 1. | .8 | 1.5 | 1.5 | 17.6 | 17.5 |
| 24 Mar 94 | M03A0221 | 12 8 | 9.9 | 19.6 | 23. | 2.5 | 2.5 | 2. | 2. | 2 5 | 2.4 | 20 5 | 20.7 | 27.4 | 18. | .1 | .1 | 9.5 | 9.5 | 1.5 | .8 | 1.5 | 1.5 | 21.9 | 17 2 |
| 28 Mar 94 | M03A0222 | 19 7 | 10.7 | 24 | 24 7 | 2.5 | 2.5 | 2 | 2. | 2 5 | 2.4 | 20.5 | 20.7 | 27. | 20.4 | .1 | 1 | 9.5 | 9.5 | 1.5 | .8 | 1.5 | 1.5 | 11 | 16 2 |
| 31 Mar-94 | M03A0223 | | | | | | | | | | | | | | | | | | | | | | | | |

## 2.2 Problem Areas and Recommended Solutions

| Problem | Solution |
|---|---|
| Maintain high level of safety awareness. | Continue daily lottery ticket program. Daily safety meetings. Supervisory safety contacts. |
| On-the-Job safety attention. | Contact all employees at least twice per day on safety issues. Review job details as work proceeds. |
| Changing conditions. | Review status and conditions daily and any time conditions change. |
| Congested work areas. | Closely coordinate work assignments. |
| Hazard detection and response. | Safety inspections. |
| DNAPL migration in S1-16 and S1-13 area. | Maintain active pumping in S1-16 and S1-13 area to control DNAPL gradient. |
| Response action plan for DNAPL and DNAPL affected areas. | Complete RIFS and develop response action plan. Install containment wall around INT-11 area. |
| DNAPL in S1-12. | Monitor status. |
| Keystone response time is too slow. | Replace Keystone with American Analytical. |
| Stabilize biomass sludge in NE corner of Cell E. | Use trackhoe mixer and pebble lime to stabilize biomass sludge. |

| | |
|---|---|
| Measurement of biological activity in the aquifer. | Measure plate count, OUR, and HMB monthly. Results show high level of biological activity in aquifer. Coupon measurements confirm activity. |
| Cell D/F water treatment. | Allow settling time in the lagoon; run test volumes through water treatment plant. |
| INT zone groundwater sample results indicate plume migration to southwest. | Install 12 new INT wells. |
| Aquifer compliance criteria. | Continued discussions of approaches. |
| Non-uniform distribution of nutrients in INT zone. | Operate 39 injection wells; install five new INT injection wells. |
| Rebound of chemicals in S1 zone on west end. | Continued pulse pumping test in this zone. |
| Wetlands site selection. | Recommended "best" site. |

## 2.3 Problems Resolved

| Problem | Solution |
|---|---|
| Poor laboratory response time. | Replace Keystone with American Analytical. |
| Expedite bioremedation in INT-11 area. | Install containment wall around DNAPL in INT-11 area. |

| | |
|---|---|
| Expedite bioremediation in INT zone to SW. | Install 12 additional INT wells. |
| Treated water effluent criteria. | Agencies approved new criteria. |
| Property acquisition for wetlands restoration. | Recommended Brownwood site. |
| Long term handling of water treatment plant sludge. | Pump to Cell D and stabilize. |

### 2.4 Deliverables Submitted

Phase II wetlands site evaluation report.

INT and S1 zone well installation work plan.

February, 1994 Monthly Report.

Final lagoon demobilization plan.

### 2.5 Upcoming/Ongoing Events and Activities

Daily safety meetings and inspections.

Lottery ticket safety awareness program.

Respond to HAZOP audits.

Redevelop low flow injection wells and pumping wells.

Daily well pump checks and maintenance.

Add INT monitoring wells, production wells, and injection wells in the landfill area.

Add S1 production wells and injection wells in S1-16 and S1-13 areas.

Dismantle and decontaminate lagoon equipment.

Test securing west end floodwall access.

Continue dewater and backfill of Cell F.

Grade Cell E for 0.5% downslope to the North.

Place topsoil in Cell E.

Stabilize biomass sludge in NE corner of Cell E.

Operate Data Base Management System.

Decontaminate scrap steel and pipe and put in the bottom of Cell F.

Total Quality process.

Continue rebound test for S1 wells South of Gulf Pump Road.

Continue biological activity monitoring in S1 wells and INT wells.

Define extent of affected groundwater to the SW.

Respond to EPA comments on DNAPL risk assessment.

Develop DNAPL response plan and aquifer compliance criteria.

Request bids for INT-11 area containment wall.

Continue QA/QC data confirmation.

Strengthen biomass in Water Treatment Plant.

Issue request for bid to construct water collection and handling system.

Optimize carbon usage in Water Treatment Plant.

Continue wetlands restoration project.

### 2.6 Key Staffing Changes

Ron Jansen to handle QAQC validation, replacing Don Flory.

### 2.7 Percent Complete

| | |
|---|---|
| Research & Development | - 97% |
| Facilities | - 100% |
| Slough | - 100% |
| Subsoil Investigation | - 100% |
| Floodwall | - 100% |
| Lagoon Remediation | - 100% |
| Groundwater | - 49% |
| Lagoon Dewatering/Fixation | - 55% |
| Water Treatment | - 45% |
| Wetlands | - 25% |
| Demobilization | - 45% |
| Monitoring | - 37% |

### 2.8 Schedule

All deliverables are on schedule.

Complete active aquifer remediation by January 1, 1996.

### 2.9 Operations and Air Monitoring Data

The operations and monitoring data are submitted as parts of Sections 3.0, 4.0, 5.0, and 6.0 of this report and are stored in secure storage at the French project office.

## 2.10 Credits Accrued/Applied

**Status of Credits**

| | Accrued this period | Accrued to date | Applied this period | Applied to date | Running total |
|---|---|---|---|---|---|
| December 1990 | 34 | 34 | 0 | 0 | 34 |
| January 1991 | 28 | 62 | 0 | 0 | 62 |
| February 1991 | 6 | 68 | 0 | 0 | 68 |
| March 1991 | 0 | 68 | 0 | 0 | 68 |
| April 1991 | 22 | 90 | 0 | 0 | 90 |
| May 1991 | 3 | 93 | 0 | 0 | 93 |
| June 1991 | 6 | 99 | 0 | 0 | 99 |
| July 1991 | 1 | 100 | 0 | 0 | 100 |
| August 1991 | 0 | 100 | 0 | 0 | 100 |
| September 1991 | 0 | 100 | 0 | 0 | 100 |
| October 1991 | 0 | 100 | 0 | 0 | 100 |
| November 1991 | 0 | 100 | 0 | 0 | 100 |
| December 1991 | 0 | 100 | 0 | 0 | 100 |
| January 1992 | 0 | 100 | 2 | 2 | 98 |
| February 1992 | 0 | 100 | 0 | 2 | 98 |
| March 1992 | 0 | 100 | 0 | 2 | 98 |
| April 1992 | 1 | 101 | 0 | 2 | 99 |
| May 1992 | 0 | 101 | 0 | 2 | 99 |
| June 1992 | 0 | 101 | 0 | 2 | 99 |
| July 1992 | 0 | 101 | 0 | 2 | 99 |
| August 1992 | 0 | 101 | 0 | 2 | 99 |
| September 1992 | 0 | 101 | 0 | 2 | 99 |
| October 1992 | 0 | 101 | 0 | 2 | 99 |
| November 1992 | 0 | 101 | 0 | 2 | 99 |
| December 1992 | 0 | 101 | 0 | 2 | 99 |
| January 1993 | 0 | 101 | 0 | 2 | 99 |
| February 1993 | 0 | 101 | 0 | 2 | 99 |
| March 1993 | 0 | 101 | 0 | 2 | 99 |
| April 1993 | 0 | 101 | 0 | 2 | 99 |
| May 1993 | 0 | 101 | 0 | 2 | 99 |
| June 1993 | 0 | 101 | 0 | 2 | 99 |
| July 1993 | 0 | 101 | 2 | 4 | 97 |
| August 1993 | 2 | 103 | 0 | 4 | 99 |
| September 1993 | 0 | 103 | 0 | 4 | 99 |
| October 1993 | 0 | 103 | 0 | 4 | 99 |
| November 1993 | 1 | 104 | 0 | 4 | 100 |
| December 1993 | 0 | 104 | 0 | 4 | 100 |
| January 1994 | 0 | 104 | 0 | 4 | 100 |
| February 1994 | 0 | 104 | 0 | 4 | 100 |
| March 1994 | 0 | 104 | 0 | 4 | 100 |

### 2.11 Community Relations

Maintained 24-hour, call-in Hot Line.

Conducted seven site tours for interested parties.

Reviewed site status with Crosby Chamber of Commerce.

Contacted nearby local residents with update on site operation.

Contacted several Riverdale residents with site status report.

Responded to numerous contacts in regards to wetlands site selection.

# 3.0 LAGOON BIOREMEDIATION

## 3.1 Summary of Activities

Completed dewater and backfill in Cell E; continued to stabilize the biomass in Cell E with pebble lime; continued to grade Cell E to create 0.5% downslope from South to North; Started to place topsoil on Cell E.

Continued to dismantle and decontaminate equipment and facilities in Cell D/F; the demobilization of Cell D/F is complete, except for the workboat and the dredges. Started to dewater and backfill Cell D/F; pumped and treated 3.1 million gallons and placed 12,400 yards of backfill.

Maintained DO, OUR, and HMB in Cell F to reduce the biomass.

## 3.2 Problems and Response Action

| Problem | Recommended Solution |
|---|---|
| Dusty conditions when handling lime. | Eliminate pneumatic transfer. Mix lime and biomass in shallow layers. |

## 3.3 Problems Resolved

Changed handling procedures to minimize dust.

Install the Cell D/F wall to isolate the water treatment plant bio sludge in Cell D for treatment.

## 3.4 Deliverables Submitted

Final lagoon demobilization plan.

### 3.5 Upcoming Events and Activities

Maintain pH, DO, OUR, and nutrient levels in Cell D/F; operate aerator/mixer in Cell D/F. Continue to dewater and backfill Cell F. Stabilize biomass sludge in Cell E. Grade Cell E. Place topsoil on Cell E.

# 4.0 GROUNDWATER AND SUBSOIL REMEDIATION

## 4.1 Summary of Activities

### 4.1.1 Operation of Production and Injection Well Systems

Operation of the production and injection wells systems during March 1994 is summarized in Table 4-1. Flows from the production well system are summarized in Table 4-2 and Figure 4-1. Flows into the injection well system are summarized in Table 4-3 and Figure 4-2. Individual well flows are summarized in Table 4-4.

### 4.1.2 Operational Monitoring

Operational monitoring associated with the groundwater and subsoil remediation system during March 1994 is summarized in Table 4-5.

### 4.1.3 Data Management and Evaluation

Operational monitoring data from the groundwater and subsoil remediation system for this reporting period were entered into FLTG's database. Tables and figures for this section of the Monthly Progress Report were generated from this database.

## 4.2 Problems and Response Actions

The groundwater production and injection rates were both above target. However, certain wells continue to show low flows. To increase flows at low-yielding wells, a program of well development is scheduled to start on April 5, using Layne Environmental Services' Smeal (well development) rig, equipped with surging, bailing, airlifting, and jetting tools. This program will evaluate whether programmed well development can enhance production and injection rates. Initial efforts will be focused on the following lower-performing wells:

| | |
|---|---|
| INT INJECTION | INT-73, 82 |
| INT PRODUCTION | INT-3, 4, 6, 7, 14, 17, 20, 33, 56 |
| S1 PRODUCTION | S1-4, 12, 20, 29 |

To reduce high back pressures, a replacement 4-inch production header for wells south of Gulf Pump Road was installed between March 9 and 17.

**Table 4-1**

| **Groundwater System Operation - March 1994**<br>*Reporting Period: February 28 - March 30 (31 days)* |
|---|
| **Production System** |
| No. of production wells: 99 (S1 unit, 49; INT unit, 50)<br>No. of operational wells: 97 (S1 unit, 47; INT unit, 50) |
| Changes in system since last month: none |
| No. of wells off line since bounceback test: 2; S1-35, S1-43<br>No. of wells on pulse pumping schedule: 6; S1-23, -33, -34, -36, -38, -42<br>No. of wells pumping DNAPL: 1; S1-16; ~25 gallons removed in 3/94 |
| Groundwater produced: 8.1 M gal; 169.5 M gal since startup based on main meter<br>Total production rate: avg. 182 gpm (target 140 gpm); range 135 - 214 gpm<br>S1 production rate: avg. 138 gpm; avg. 2.9 gpm per well<br>INT production rate: avg. 44 gpm; avg. 0.9 gpm per well<br>Total flow rate apportioned between S1 and INT units based on individual well meter readings |
| TOC (non-volatile) concentration avg. 120 ppm; range 45 - 245 ppm<br>TOC mass removed: 8,170 lb (319,650 lb since startup); 264 lb/day |
| **Injection System** |
| No. of injection wells: 47 (S1 unit, 11; INT unit, 36); all operational |
| Rainfall during period: not measured |
| Changes in system since last month: After March 13, RO product replaced groundwater treatment plant product as injection water supplement. |
| Groundwater injected: 4.5 M gal (77.7 M gal since startup) based on main meters<br>Percentage of injected water recycled from treatment plant: ~25% |
| S1 unit injected: 2.1 M gal (45.8 M gal since startup)<br>INT unit injected: 2.4 M gal (31.9 M gal since startup)<br>Total injection rate: avg. 102 gpm (target 100 gpm); range 82 - 110 gpm<br>S1 injection rate: avg. 48 gpm; avg. 4.4 gpm per well<br>INT injection rate: avg. 53 gpm; avg. 1.5 gpm per well<br>Total flow rate apportioned between S1 and INT units based on individual well meter readings |
| Avg. DO in injection water: S1, 25.9 ppm; INT, 26.8 ppm (target 40 ppm) |
| Volume of 4.7% w/w $KNO_3$ nutrient solution added to INT unit: 21,589 gal<br>Nutrient flow rate: 696 gpd (0.48% of INT inflow rate)<br>Calculated injection water $NO_3$ concentration: 32 mg/L-N (target 50 mg/L-N) |

## Table 4-2

### Daily Flows, TOC Concentrations and TOC Loadings
### March 1994

| Date | Project Day | T-101 Outflow Rate (FQ-101A) (gpd) | T-101 Outflow Rate (gpm) | T-101 Influent Ave. TOC (mg/L) | T-101 Influent TOC Loading (kg/day) |
|---|---|---|---|---|---|
| 28-Feb | 782 | 238,800 | 166 | 114 | 103 |
| 1-Mar | 783 | 268,100 | 186 | 47 | 47 |
| 2-Mar | 784 | 252,900 | 176 | 135 | 129 |
| 3-Mar | 785 | 261,300 | 181 | 61 | 60 |
| 4-Mar | 786 | 275,200 | 191 | 86 | 89 |
| 5-Mar | 787 | 254,000 | 176 | 51 | 49 |
| 6-Mar | 788 | 247,200 | 172 | 143 | 134 |
| 7-Mar | 789 | 245,300 | 170 | 91 | 85 |
| 8-Mar | 790 | 247,800 | 172 | 182 | 171 |
| 9-Mar | 791 | 261,400 | 182 | 104 | 103 |
| 10-Mar | 792 | 271,000 | 188 | 167 | 172 |
| 11-Mar | 793 | 279,600 | 194 | 245 | 260 |
| 12-Mar | 794 | 194,500 | 135 | 69 | 51 |
| 13-Mar | 795 | 272,200 | 189 | 173 | 179 |
| 14-Mar | 796 | 233,200 | 162 | 190 | 168 |
| 15-Mar | 797 | 258,400 | 179 | 45 | 44 |
| 16-Mar | 798 | 281,000 | 195 | 172 | 183 |
| 17-Mar | 799 | 280,100 | 195 | 199 | 211 |
| 18-Mar | 800 | 248,100 | 172 | 138 | 129 |
| 19-Mar | 801 | 269,600 | 187 | 164 | 167 |
| 20-Mar | 802 | 279,700 | 194 | 66 | 70 |
| 21-Mar | 803 | 267,000 | 185 | 51 | 52 |
| 22-Mar | 804 | 307,500 | 214 | 131 | 152 |
| 23-Mar | 805 | 282,800 | 196 | 158 | 169 |
| 24-Mar | 806 | 251,600 | 175 | 87 | 83 |
| 25-Mar | 807 | 238,900 | 166 | 71 | 64 |
| 26-Mar | 808 | 272,800 | 189 | 111 | 114 |
| 27-Mar | 809 | 271,100 | 188 | 67 | 68 |
| 28-Mar | 810 | 239,500 | 166 | 173 | 156 |
| 29-Mar | 811 | 300,200 | 208 | 151 | 171 |
| 30-Mar | 812 | 255,600 | 178 | 84 | 81 |
| Month Average | | 261,497 | 182 | 120 | 120 |
| Month Total | | 8,106,400 | | | 3,714 |
| Project Average | | 208,775 | 145 | 255 | 179 |
| Project Total | | 169,525,456 | | | 145,292 |

## Table 4-3

### Daily Injection Flows
### S1 and INT Injection Well Systems
### March 1994

| Date | Project Day | S1 (pre 1/3/94) Injection Wells Meter FQ-905 | | S1 Injection Wells (905-909) | | INT North Injection Wells Meter FQ-906 | | INT South Injection Wells Meter FQ-909 | | Total Injection Rate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (gpd) | (gpm) | (gpd) | (gpm) | (gpd) | (gpm) | (gpd) | (gpm) | (gpd) | (gpm) |
| 28-Feb | 782 | 126,800 | 88 | 73,200 | 51 | 25,400 | 18 | 53,600 | 37 | 152,200 | 106 |
| 1-Mar | 783 | 126,000 | 88 | 73,500 | 51 | 25,300 | 18 | 52,500 | 36 | 151,300 | 105 |
| 2-Mar | 784 | 127,300 | 88 | 74,300 | 52 | 25,800 | 18 | 53,000 | 37 | 153,100 | 106 |
| 3-Mar | 785 | 130,700 | 91 | 76,900 | 53 | 28,000 | 19 | 53,800 | 37 | 158,700 | 110 |
| 4-Mar | 786 | 127,500 | 89 | 75,100 | 52 | 27,200 | 19 | 52,400 | 36 | 154,700 | 107 |
| 5-Mar | 787 | 125,800 | 87 | 73,900 | 51 | 26,600 | 18 | 51,900 | 36 | 152,400 | 106 |
| 6-Mar | 788 | 121,200 | 84 | 69,800 | 48 | 26,200 | 18 | 51,400 | 36 | 147,400 | 102 |
| 7-Mar | 789 | 125,300 | 87 | 72,900 | 51 | 26,500 | 18 | 52,400 | 36 | 151,800 | 105 |
| 8-Mar | 790 | 128,600 | 89 | 75,200 | 52 | 26,800 | 19 | 53,400 | 37 | 155,400 | 108 |
| 9-Mar | 791 | 127,500 | 89 | 74,100 | 51 | 26,700 | 19 | 53,400 | 37 | 154,200 | 107 |
| 10-Mar | 792 | 124,100 | 86 | 72,200 | 50 | 26,400 | 18 | 51,900 | 36 | 150,500 | 105 |
| 11-Mar | 793 | 121,200 | 84 | 69,000 | 48 | 26,700 | 19 | 52,200 | 36 | 147,900 | 103 |
| 12-Mar | 794 | 107,800 | 75 | 60,600 | 42 | 24,200 | 17 | 47,200 | 33 | 132,000 | 92 |
| 13-Mar | 795 | 121,800 | 85 | 69,600 | 48 | 28,200 | 20 | 52,200 | 36 | 150,000 | 104 |
| 14-Mar | 796 | 120,600 | 84 | 67,700 | 47 | 27,200 | 19 | 52,900 | 37 | 147,800 | 103 |
| 15-Mar | 797 | 118,200 | 82 | 66,300 | 46 | 26,500 | 18 | 51,900 | 36 | 144,700 | 100 |
| 16-Mar | 798 | 117,000 | 81 | 65,300 | 45 | 26,400 | 18 | 51,700 | 36 | 143,400 | 100 |
| 17-Mar | 799 | 114,600 | 80 | 63,500 | 44 | 26,100 | 18 | 51,100 | 35 | 140,700 | 98 |
| 18-Mar | 800 | 110,400 | 77 | 60,800 | 42 | 25,400 | 18 | 49,600 | 34 | 135,800 | 94 |
| 19-Mar | 801 | 96,600 | 67 | 53,100 | 37 | 24,800 | 17 | 43,500 | 30 | 121,400 | 84 |
| 20-Mar | 802 | 93,290 | 65 | 50,190 | 35 | 25,100 | 17 | 43,100 | 30 | 118,390 | 82 |
| 21-Mar | 803 | 104,500 | 73 | 61,100 | 42 | 26,100 | 18 | 43,400 | 30 | 130,600 | 91 |
| 22-Mar | 804 | 124,000 | 86 | 73,000 | 51 | 28,700 | 20 | 51,000 | 35 | 152,700 | 106 |
| 23-Mar | 805 | 125,900 | 87 | 74,700 | 52 | 28,400 | 20 | 51,200 | 36 | 154,300 | 107 |
| 24-Mar | 806 | 125,900 | 87 | 74,300 | 52 | 28,000 | 19 | 51,600 | 36 | 153,900 | 107 |
| 25-Mar | 807 | 126,800 | 88 | 74,400 | 52 | 27,300 | 19 | 52,400 | 36 | 154,100 | 107 |
| 26-Mar | 808 | 127,300 | 88 | 74,500 | 52 | 27,900 | 19 | 52,800 | 37 | 155,200 | 108 |
| 27-Mar | 809 | 124,300 | 86 | 72,400 | 50 | 25,900 | 18 | 51,900 | 36 | 150,200 | 104 |
| 28-Mar | 810 | 118,000 | 82 | 67,800 | 47 | 26,500 | 18 | 50,200 | 35 | 144,500 | 100 |
| 29-Mar | 811 | 117,700 | 82 | 66,500 | 46 | 26,900 | 19 | 51,200 | 36 | 144,600 | 100 |
| 30-Mar | 812 | 115,700 | 80 | 65,600 | 46 | 26,400 | 18 | 50,100 | 35 | 142,100 | 99 |
| Month Average | | 120,077 | 83 | 69,080 | 48 | 26,568 | 18 | 50,997 | 35 | 146,645 | 102 |
| Month Total | | 3,722,390 | | 2,141,490 | | 823,600 | | 1,580,900 | | 4,545,990 | |
| Project Average | | 76,003 | 53 | 47,957 | 33 | 32,698 | 23 | 62,940 | 44 | 108,701 | 75 |
| Project Total | | 54,341,883 | | 4,124,290 | | 23,379,228 | | 5,412,800 | | 77,721,111 | |

## Table 4-4

### Average Production and Injection Flow Rates - March 1994

S1 Production Wells (49)

| Well ID | gpm |
|---|---|
| S1-1 | 0.80 |
| S1-2 | 0.58 |
| S1-3 | 0.45 |
| S1-4 | 0.14 |
| S1-5 | 0.35 |
| S1-6 | 2.43 |
| S1-7 | 0.91 |
| S1-8 | 0.67 |
| S1-9 | 2.06 |
| S1-10 | 2.81 |
| S1-11 | 2.62 |
| S1-12 | 0.00 |
| S1-13 | NM |
| S1-14 | 0.43 |
| S1-15 | 1.00 |
| S1-16 | NM |
| S1-17 | 0.88 |
| S1-18 | 1.02 |
| S1-19 | 2.28 |
| S1-20 | 0.32 |
| S1-21 | 1.70 |
| S1-22 | 3.90 |
| S1-23 | 5.15 (PP) |
| S1-24 | 4.83 |
| S1-25 | 1.55 |
| S1-26 | 4.43 |
| S1-27 | 0.78 |
| S1-28 | 2.21 |
| S1-29 | 0.33 |
| S1-30 | 5.33 |
| S1-31 | 2.65 |
| S1-32 | 2.63 |
| S1-33 | 4.50 (PP) |
| S1-34 | 2.57 (PP) |
| S1-35 | OFF |
| S1-36 | 4.29 (PP) |
| S1-37 | 3.83 (PP) |
| S1-38 | 3.98 (PP) |
| S1-39 | 5.90 |
| S1-40 | 2.33 |
| S1-41 | 5.34 |
| S1-42 | 9.70 (PP) |
| S1-43 | OFF |
| S1-44 | 3.80 |
| S1-45 | 9.04 |
| S1-46 | 11.74 |
| S1-47 | 3.51 |
| S1-48 | 1.76 |
| S1-60 | 4.07 |
| **Total** | **131.6** |
| **Average** | **2.93** |

S1 Injection Wells (11)

| Well ID | gpm |
|---|---|
| S1-49 | 3.67 |
| S1-50 | 4.49 |
| S1-51 | 2.05 |
| S1-52 | 4.40 |
| S1-53 | 4.46 |
| S1-54 | 5.06 |
| S1-55 | 2.63 |
| S1-56 | 4.61 |
| S1-57 | 3.49 |
| S1-58 | 1.48 |
| S1-59 | 3.69 |
| **Total** | **40.0** |
| **Average** | **3.64** |

Notes
PP - pulse pumping
OFF - well off, no bounceback
NM - well running but not metered

INT Production Wells (50)

| Well ID | gpm |
|---|---|
| INT-1 | 0.94 |
| INT-2 | 0.39 |
| INT-3 | 0.12 |
| INT-4 | 0.18 |
| INT-5 | 0.72 |
| INT-6 | 0.08 |
| INT-7 | 0.22 |
| INT-8 | 0.83 |
| INT-9 | 0.54 |
| INT-10 | 2.68 |
| INT-11 | 0.20 |
| INT-12 | 1.23 |
| INT-13 | 0.29 |
| INT-14 | 0.20 |
| INT-15 | 0.76 |
| INT-16 | 0.30 |
| INT-17 | 0.20 |
| INT-18 | 0.58 |
| INT-19 | 1.10 |
| INT-20 | 0.08 |
| INT-21 | 0.29 |
| INT-22 | 0.49 |
| INT-23 | 0.22 |
| INT-24 | 0.54 |
| INT-25 | 0.43 |
| INT-26 | 0.36 |
| INT-27 | 1.99 |
| INT-28 | 0.49 |
| INT-29 | 2.34 |
| INT-30 | 0.95 |
| INT-31 | 1.24 |
| INT-32 | 1.05 |
| INT-33 | 0.09 |
| INT-55 | 3.90 |
| INT-56 | 0.21 |
| INT-57 | 1.55 |
| INT-58 | NM |
| INT-59 | 0.26 |
| INT-60 | 2.03 |
| INT-61 | 0.57 |
| INT-62 | 0.29 |
| INT-65 | 1.47 |
| INT-66 | 0.61 |
| INT-205 | 0.63 |
| INT-206 | 1.57 |
| INT-207 | 0.71 |
| INT-208 | 1.51 |
| INT-209 | 0.51 |
| INT-210 | 2.93 |
| INT-211 | 1.62 |
| **Total** | **42.5** |
| **Average** | **0.87** |

INT Injection Wells (36)

| Well ID | gpm |
|---|---|
| INT-63 | 2.75 |
| INT-64 | 3.15 |
| INT-71 | 2.67 |
| INT-72 | 0.70 |
| INT-73 | 0.29 |
| INT-74 | 1.33 |
| INT-75 | 1.77 |
| INT-76 | 2.87 |
| INT-77 | 2.64 |
| INT-78 | 1.92 |
| INT-79 | 0.94 |
| INT-80 | 1.68 |
| INT-81 | 1.05 |
| INT-82 | 0.05 |
| INT-83 | 1.15 |
| INT-84 | 1.78 |
| INT-85 | 1.23 |
| INT-86 | 1.53 |
| INT-87 | 0.79 |
| INT-88 | 0.73 |
| INT-89 | 3.65 |
| INT-90 | 2.65 |
| INT-91 | 1.79 |
| INT-92 | 2.83 |
| INT-93 | 0.76 |
| INT-94 | 1.99 |
| INT-95 | 1.65 |
| INT-96 | 0.84 |
| INT-97 | 0.41 |
| INT-98 | 1.81 |
| INT-99 | 1.97 |
| INT-100 | 1.17 |
| INT-201 | 1.84 |
| INT-202 | 0.93 |
| INT-203 | 1.63 |
| INT-204 | 1.00 |
| **Total** | **57.9** |
| **Average** | **1.61** |

**Table 4-5**

**Operational Monitoring - March 1994**

| Activity | Frequency | Purpose |
|---|---|---|
| Check production and injection wells for pump, meter, and level control operation, injection pressure, gas buildup, and flow meter readings. | Daily | Identify and respond to individual well problems; maintain operating efficiency. |
| Read groundwater treatment plant inflow and outflow meters; nutrient injection flow meters; oxygen flows, pressure and temperature; and injection header back pressure. | Daily (shift changes) | Identify and respond to treatment plant problems; control nutrient and injection flow rates. |
| Measure T-101 influent and effluent TOC concentrations. | Daily (shift changes) | Track removal of TOC. |
| Measure rainfall. | Daily | Assists interpretation of water level maps. |
| Sample for nutrients (K, $NO_3$) at INT injection wells. Four wells are sampled per week on a three-week schedule, so that a complete survey of the injection system is performed every three weeks. | Weekly | Check on nutrient injection rate. |
| Measure dissolved oxygen at S1 and INT injection wells. | Weekly | Main control for oxygen injection rate. |
| Sample T-101 influent for TCL VOC, TOC, and nutrient analysis, (1) from all operating production wells, and (2) from all wells located outside the floodwall. | Monthly | Develop chemical mass balance. |
| Monitor groundwater levels at all monitoring wells. | Monthly | Verify capture zones. |
| Monitor in-situ DO at all monitoring wells. | Monthly | Monitor development of aerobic conditions. |
| Sample groundwater at all production wells for on-site TOC analysis. | Monthly | Track TOC removal. |
| Measure DNAPL thickness at selected monitoring wells. | Quarterly | Monitor presence and level of DNAPL. |
| Sample pulse pumping wells. | Special (Table 4-7) | Monitor effect of pulse pumping. |

Figure 4-1

**Groundwater Production Rate**

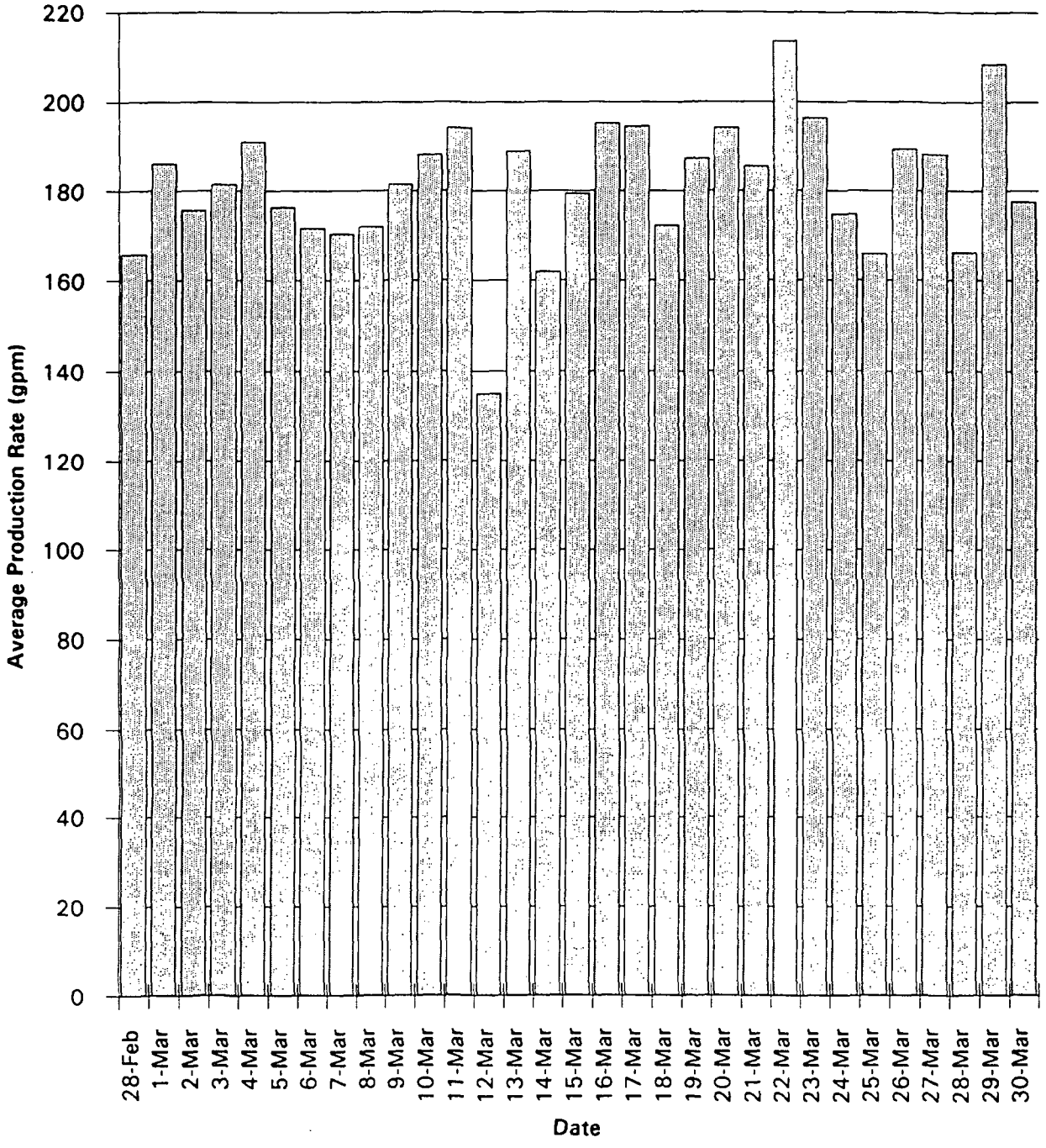
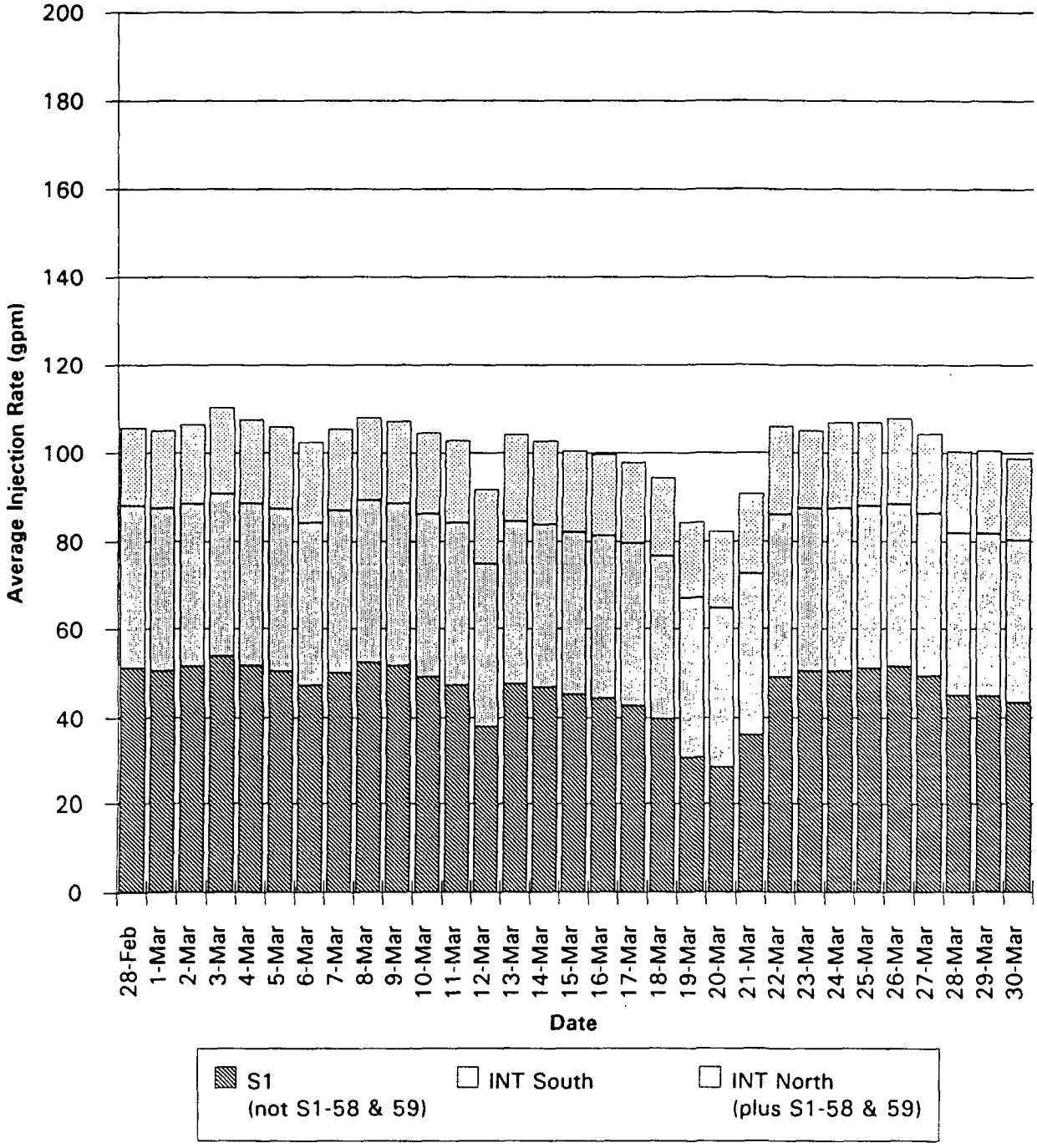


**Figure 4-2**

**Groundwater Injection Rate**



Both nutrient and dissolved oxygen concentrations in injection water were below target levels. Low nutrient levels were due to a combination of the increase in injection rates, and the physical limitations on nutrient storage at the site. To remedy this, FLTG will obtain a more concentrated nutrient formula from the nutrient supplier. DO levels have been limited by the flow meter limit on the S1 header, and because offgassing was significant on the INT headers. However, offgassing is acceptable if required to maintain target DO levels. To reach target DO concentrations, a larger capacity flow meter will be installed on the S1 header, and oxygen injection rates will be increased on the INT headers.

## 4.3 Pending Issues

### 4.3.1 DNAPL Study

An additional soil boring (INT-143) was performed in the INT-11 DNAPL area on March 24, to further refine DNAPL definition in this area. The boring was fully sampled over the lower part of the S1 unit and all the INT unit. OVM readings were low; zero to slight odors were noted; little staining was observed; and no DNAPL was detected. Based on this data, the length of a cutoff structure required to contain this DNAPL-affected area has been reduced by 15%. INT-143 was completed as a 4-inch monitoring well. The boring log and well construction details are presented in Attachment 4A. Six additional CPT soundings (SW-1 through SW-6) were performed on March 25-28, to obtain detailed stratigraphic information for the INT-11 DNAPL area.

### 4.3.2 Western Area Well Installation

A program of additional INT monitoring, injection, and production wells, to enhance remediation rates in the western part of the plume and to explore its western extension, was started on March 15. For this program, and the eastern area program (see Section 4.3.3) all well locations were first characterized by CPT sounding. This work was performed by Terra Technologies, Inc. Well installation was performed by Layne Environmental Services. Progress to date is summarized in Table 4-6. Well locations are shown on Figure 4-3.

### 4.3.3 Eastern Area Well Installation

The above well installation program is combined with a program for additional injection and production wells in the S1-13 and S1-16 areas, outside the floodwall. The purpose of these wells is to enhance bioremediation rates in the VOC plumes that were defined by the DNAPL study in these two areas. Progress to date is summarized in Table 4-6. Well locations are shown on Figures 4-4 and 4-5.

## Table 4-6

## Well Installation Program - Progress

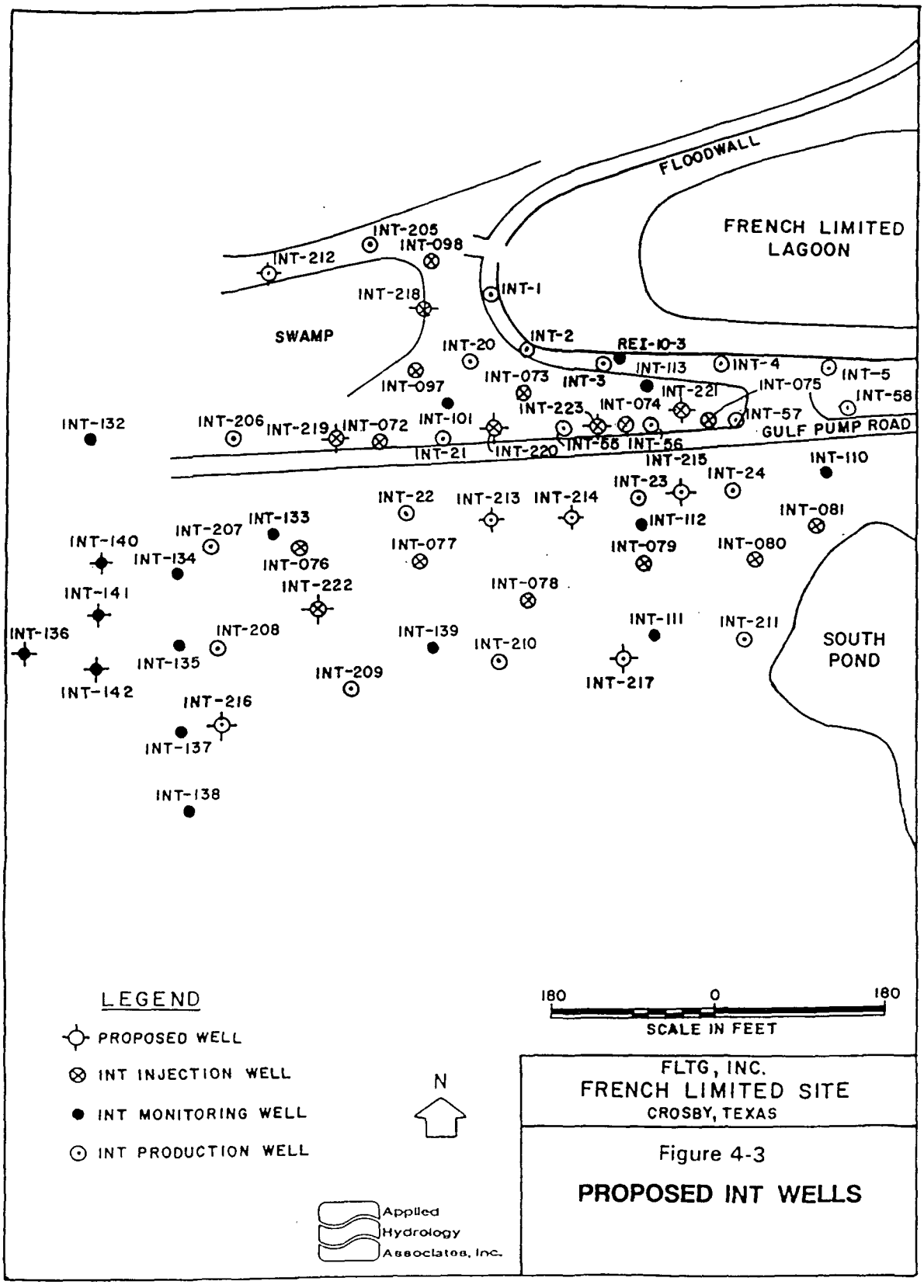
| Well number | Type of well | CPT date | Depths (ft BGS) | | | | Well construction | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | S1 | C1 | INT | C2 | Method | Dia. (in) | Casing | TD (ft) | Sump (ft) | Screen (ft) | Top of Screen | Material | Slot Size | Filter Grade | Top of Filter | Top of Seal | Stickup (ft) | Casing installed | Well installed | Well developed | Gallons removed | Well vols removed | Pad completed |
| INT-136 | M | 3/16/94 | 7.2 | 19.7 | 36.0 | 51.5 | HSA | 4 | NA | 52 | 2 | 15 | 35 | PVC | 10*** | 20/40 | 33 | 31 | flush | NA | 3/18/94 | 3/31 - 4/1 | 393 | 25.5 | 3/28/94 |
| INT-140 | M | 3/17/94 | 8.9 | 17.4 | 31.5 | 51.5 | HSA | 4 | NA | 54 | 2 | 20 | 32 | PVC | 10 | 20/40 | 30 | 28 | flush | NA | 3/21/94 | 3/31 - 4/1 | 438 | 20.0 | 3/28/94 |
| INT-141 | M | 3/17/94 | 11.0 | 20.0 | 34.0 | 56.0 | HSA | 4 | NA | 59 | 2 | 20 | 37 | PVC | 10 | 20/40 | 35 | 33 | flush | NA | 3/22/94 | 3/31 - 4/1 | 478 | 20.4 | 3/28/94 |
| INT-142 | M | 3/16/94 | 10.0 | 24.0 | 40.0 | 59.0 | HSA | 4 | NA | 60 | 2 | 20 | 38 | PVC | 10 | 20/40 | 37 | 35 | flush | NA | 3/17/94 | 3/31 - 4/1 | 460 | 21.3 | 3/28/94 |
| INT-143 | M | No CPT | 16.0 | 33.0 | 34.6 | 50.0 | HSA | 4 | NA | 53 | 2 | 15 | 36 | SS | 10 | 20/40 | 34 | 32 | 2 | NA | 3/24/94 | | | | |
| INT-212 | P | 3/15/94 | 9.5 | 22.3 | 34.8 | 63.0 | WR** | 6 | NA | 63 | 2 | 25 | 36 | SS | 10 | 20/40 | 34 | 32 | 2 | NA | | | | | |
| INT-213# | P | 3/30/94* | 12.8 | 21.2 | 31.5 | 59.0 | WR** | 6 | NA | 59 | 2 | 25 | 32 | SS | 10 | 20/40 | 30 | 28 | 2 | NA | | | | | |
| INT-214# | P | 3/31/94 | 13.1 | 23.3 | 25.3 | 47.2 | WR** | 6 | NA | 49 | 2 | 20 | 27 | SS | 10 | 20/40 | 25 | 23 | 2 | NA | | | | | |
| INT-215# | P | 3/31/94 | 11.5 | NA | 25.3 | 45.3 | WR** | 6 | NA | 49 | 2 | 20 | 27 | SS | 10 | 20/40 | 25 | 23 | 2 | NA | | | | | |
| INT-216 | P | 3/16/94 | 14.0 | 25.6 | 36.0 | 59.0 | WR** | 6 | NA | 59 | 2 | 20 | 37 | SS | 10 | 20/40 | 35 | 33 | 2 | NA | | | | | |
| INT-217# | P | 4/4/94 | 12.1 | 20.8 | 31.8 | 54.4 | WR** | 6 | NA | 54 | 2 | 20 | 32 | SS | 10 | 20/40 | 30 | 28 | 2 | NA | | | | | |
| INT-218 | I | 3/22/94* | 7.5 | 25.0 | 35.5 | 63.5 | MR/WR | 2 | 36 | 63 | 2 | 25 | 36 | SS | 10 | 20/40 | 33 | 30 | 2 | 3/25/94 | 4/6/94 | | | | |
| INT-219 | I | 3/21/94 | 10.8 | 20.7 | 33.1 | 53.5 | MR/WR | 2 | 33 | 55 | 2 | 20 | 33 | SS | 10 | 20/40 | 31 | 29 | 2 | 4/4/94 | *4/8/94* | | | | |
| INT-220 | I | 3/21/94 | 13.8 | NA | 23.0 | 50.5 | MR/WR | 2 | 32 | 52 | 2 | 20 | 30 | SS | 10 | 20/40 | 28 | 26 | 2 | 3/30/94 | NEXT | | | | |
| INT-221 | I | 3/15/94 | 12.0 | NA | 30.0 | 59.0 | MR/WR | 2 | 39 | 61 | 2 | 20 | 39 | SS | 10 | 20/40 | 37 | 35 | 2 | 3/23/94 | 4/5/94 | | | | |
| INT-222 | I | 3/21/94 | 8.5 | 25.3 | 40.0 | 50.2 | MR/WR | 2 | 39 | 52 | 2 | 10 | 40 | SS | 10 | 20/40 | 37.5 | 35.5 | 2 | 3/31/94 | 4/7/94 | | | | |
| INT-223 | I | 3/22/94 | 12.0 | 25.0 | 29.0 | 55.0 | MR/WR | 2 | 34 | 57 | 2 | 20 | 35 | SS | 10 | 20/40 | 31 | 29 | 2 | 3/29/94 | 4/7/94 | | | | |
| S1-61 | P | 3/29/94 | 14.8 | 28.4 | 37.7 | NA | HSA | 6 | NA | 30 | 2 | 10 | 18 | SS | 20 | 10/20 | 16 | 14 | 1 | NA | | | | | |
| S1-62 | P | 3/30/94 | 14.8 | 27.2 | 35.8 | NA | HSA | 6 | NA | 29 | 2 | 10 | 17 | SS | 20 | 10/20 | 15 | 13 | 1 | NA | | | | | |
| S1-63 | P | 3/22/94 | 12.5 | 33.5 | 36.0 | NA | HSA | 6 | NA | 36 | 2 | 20 | 14 | SS | 20 | 10/20 | 12 | 10 | 1 | NA | | | | | |
| S1-64 | P | 3/23/94 | 8.0 | 31.8 | 36.7 | NA | HSA | 6 | NA | 34 | 2 | 20 | 12 | SS | 20 | 10/20 | 10 | 8 | 1 | NA | | | | | |
| S1-65 | I | 3/25/94 | 12.8 | 27.9 | 33.5 | NA | HSA | 4 | NA | 30 | 2 | 15 | 13 | PVC | 20 | 10/20 | 12 | 10 | 2 | NA | | | | | |
| S1-66 | I | 3/24/94 | 10.5 | 25.3 | 31.2 | NA | HSA | 4 | NA | 27 | 2 | 15 | 10 | PVC | 20 | 10/20 | 9 | 7 | 2 | NA | | | | | |
| S1-67 | I | 3/24/94 | 9.8 | 25.6 | 33.0 | NA | HSA | 4 | NA | 28 | 2 | 15 | 11 | PVC | 20 | 10/20 | 10 | 8 | 2 | NA | | | | | |
| S1-68 | I | 3/24/94 | 10.2 | 24.3 | 34.0 | NA | HSA | 4 | NA | 26 | 2 | 15 | 9 | PVC | 20 | 10/20 | 8 | 6 | 2 | NA | | | | | |
| S1-69 | I | 3/23/94 | 10.2 | 27.0 | 33.8 | NA | HSA | 4 | NA | 29 | 2 | 15 | 12 | PVC | 20 | 10/20 | 10 | 8 | 2 | NA | | | | | |
| S1-70 | I | 3/24/94 | 11.8 | 27.9 | 34.8 | NA | HSA | 4 | NA | 30 | 2 | 15 | 13 | PVC | 20 | 10/20 | 12 | 10 | 2 | NA | | | | | |
| SW-1 | SW | 3/28/94 | 11.8 | 32.8 | 34.1 | 56.7 | | | | | | | | | | | | | | | | | | | |
| SW-2 | SW | 3/28/94 | 12.1 | 32.1 | 33.5 | 52.2 | | | | | | | | | | | | | | | | | | | |
| SW-3 | SW | 3/29/94 | 9.2 | 30.8 | 34.1 | 53.0 | (SW-1 through SW-6 not to be completed as wells - CPTs are for slurry wall design only) | | | | | | | | | | | | | | | | | | |
| SW-4 | SW | 3/25/94 | 7.9 | 26.7 | 33.8 | 51.2 | | | | | | | | | | | | | | | | | | | |
| SW-5 | SW | 3/25/94 | 7.5 | 25.6 | 31.8 | 49.9 | | | | | | | | | | | | | | | | | | | |
| SW-6 | SW | 3/28/94 | 13.1 | 30.5 | 34.4 | 55.0 | | | | | | | | | | | | | | | | | | | |

Notes:
INT-143 logged in detail for DNAPL: no DNAPL detected
# Layne prepunched; (1) set 2" casings; (2) backfilled with compacted sand
Black tarry waste with odor at INT-215: sample collected 3/29/94
* INT-218: 3/15/94: refusal at 52 ft: CPT repeated 3/22/94
INT-213: 3/23/94: refusal at 49 ft: CPT repeated 3/30/94
** may use HSA as temp conductor casing if required
*** 35-40 ft, 010 slot; 40-50 ft, 020 slot

Conductor casing - 6" ID low-carbon steel
Casing and sumps - PVC Schedule 40
Casings, screens, and sumps - flush-threaded
Filter sand placed 2 ft above screen (1 ft for S1 injection)
Bentonite pellet seal at least 2 ft.
Grout - Portland Type I, 2-6% bentonite

HSA: hollow-stem auger
MR: mud rotary
WR: wet rotary

INT injection wells have a minimum 5-ft separation between the base of the S1 unit and the top of the filter pack


FLOODWALL
FRENCH LIMITED LAGOON
SWAMP
SOUTH POND
GULF PUMP ROAD
INT-205
INT-098
INT-212
INT-218
INT-1
INT-2
INT-20
REI-10-3
INT-113
INT-4
INT-5
INT-58
INT-097
INT-073
INT-3
INT-221
INT-075
INT-223
INT-074
INT-57
INT-132
INT-206
INT-219
INT-072
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INT-55
INT-56
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INT-23
INT-24
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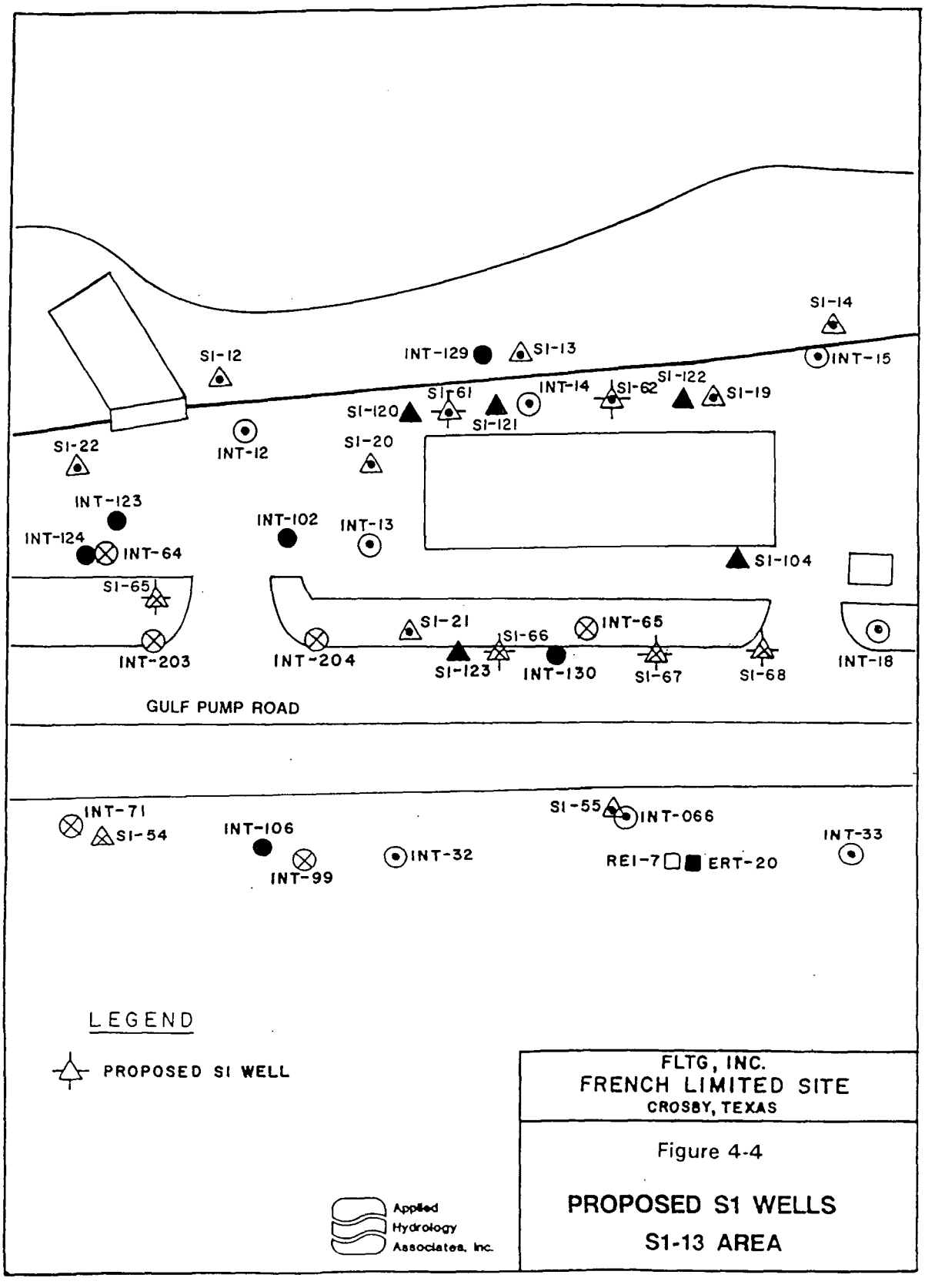
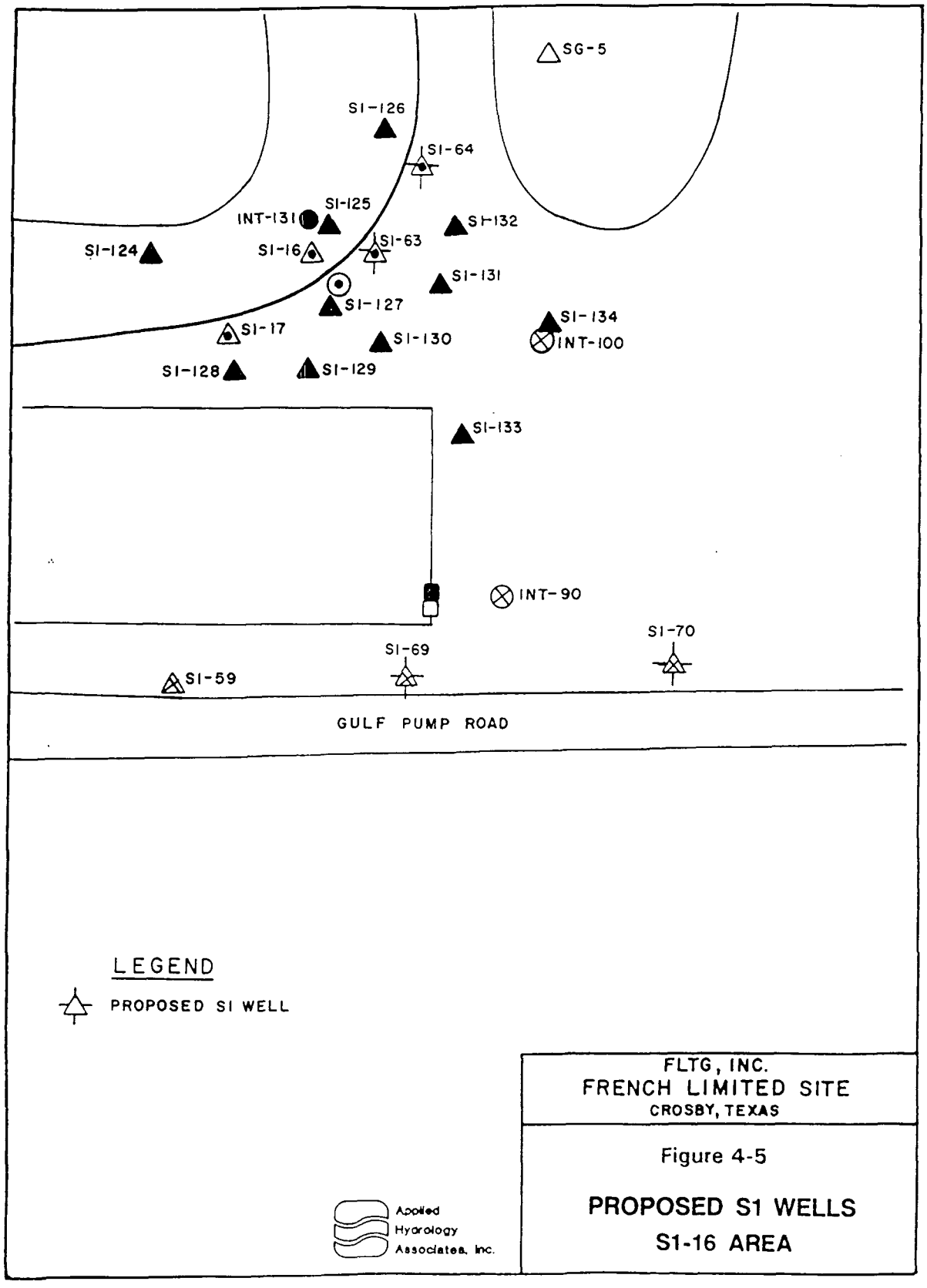
INT-213
INT-214
INT-081
INT-112
INT-207
INT-133
INT-140
INT-134
INT-076
INT-077
INT-079
INT-080
INT-141
INT-222
INT-078
INT-136
INT-208
INT-139
INT-111
INT-211
INT-135
INT-210
INT-209
INT-217
INT-142
INT-216
INT-137
INT-138
LEGEND
PROPOSED WELL
INT INJECTION WELL
INT MONITORING WELL
INT PRODUCTION WELL
N
180
0
180
SCALE IN FEET
Applied Hydrology Associates, Inc.
FLTG, INC.
FRENCH LIMITED SITE
CROSBY, TEXAS
Figure 4-3
PROPOSED INT WELLS


SI-14
SI-12
INT-129
SI-13
INT-15
SI-61
INT-14
SI-62
SI-122
SI-19
SI-120
SI-121
SI-22
INT-12
SI-20
INT-123
INT-124
INT-64
INT-102
INT-13
SI-104
SI-65
INT-203
INT-204
SI-21
SI-66
INT-65
SI-123
INT-130
SI-67
SI-68
INT-18
GULF PUMP ROAD
INT-71
SI-54
INT-106
INT-99
INT-32
SI-55
INT-066
INT-33
REI-7
ERT-20
LEGEND
PROPOSED SI WELL
FLTG, INC.
FRENCH LIMITED SITE
CROSBY, TEXAS
Figure 4-4
PROPOSED S1 WELLS
S1-13 AREA
Applied Hydrology Associates, Inc.


SG-5
SI-126
SI-64
SI-125
INT-131
SI-132
SI-124
SI-16
SI-63
SI-131
SI-127
SI-134
SI-17
SI-130
INT-100
SI-128
SI-129
SI-133
INT-90
SI-70
SI-69
SI-59
GULF PUMP ROAD
LEGEND
PROPOSED SI WELL
FLTG, INC.
FRENCH LIMITED SITE
CROSBY, TEXAS
Figure 4-5
PROPOSED S1 WELLS
S1-16 AREA
Applied Hydrology Associates, Inc.

#### 4.3.4 S1 Unit Pulse Pumping

Pulse pumping continued at selected S1 unit production wells which are close to cleanup criteria. The pulse pumping schedule is weekly and started on January 24. The current pulse pumping program, which includes wells S1-23, -33, -34, -36, 37, -38, and -42 is shown in Table 4-7. Wells S1-35 and S1-43 have been taken off line since they did not show bounceback effects. Results of the first sampling set since pulse pumping started were encouraging: VOCs were either not detected or well below cleanup criteria.

### 4.4 Operational Refinements

Quarterly groundwater monitoring was performed during March. A refinement notice (RN-76) describing modifications to the groundwater sampling and analysis program for this event was submitted and approved. The 20 wells normally sampled quarterly are unchanged. However, the following analytical parameters were removed from the program:

| | |
|---|---|
| Field parameters: | Nutrients |
| Lab parameters: | TOC, TOC-FLTG, TIC, TOX, TPH, cations except K, anions, semivolatiles |

Refinement Notice RN-76 is included in Attachment 4B, and the amended March 1994 program is shown in Table 4-8. The modifications recognize that the primary purpose of quarterly sampling is to track remedial progress and identify areas that may require enhanced bioremediation. Specific justification for not performing individual analyses follows:

| | |
|---|---|
| Nutrients | Field analyses are less accurate than lab analyses, which continue. |
| TOC | Field TOC correlates well with lab results; lab analyses are redundant. |
| TOC-FLTG/TIC/TOX/TPH | Indirect indicators of cleanup parameters; no longer useful for analysis of remedial progress. |
| Cations and anions | Indirect indicators of injection water; only potassium (K) is now useful. |
| Semivolatiles | Generally not detected or well below cleanup criteria in December 1993 results; semivolatile compounds migrate slowly relative to volatile compounds; little change from December results is expected. |

**Table 4-7**

**Pulse Pumping Program**

| Date | S1-23, 38, 42 | S1-33, 34, 36, 37 | Sampling |
|---|---|---|---|
| 1/3/94 | ON | ON | None |
| 1/10/94 | ON | ON | None |
| 1/17/94 | ON | ON | None |
| 1/24/94 | OFF | OFF | Water level monitoring only |
| 1/31/94 | ON | ON | None |
| 2/7/94 | ON | OFF | None |
| 2/14/94 | OFF | ON | S1-33, 34, 36, & 37* |
| 2/21/94 | ON | OFF | S1-23, 38, & 42* |
| 2/28/94 | OFF | ON | None |
| 3/7/94 | ON | OFF | None |
| 3/14/94 | OFF | OFF | None |
| 3/21/94 | OFF | ON | S1-33, 34, 36, & 37 |
| 3/28/94 | ON | OFF | S1-23, 38, & 42 |
| 4/4//94 | OFF | ON | None |
| 4/11/94 | ON | OFF | None |
| 4/18/94 | OFF | ON | S1-33, 34, 36, & 37 |
| 4/25/94 | ON | OFF | S1-23, 38, & 42 |

* Results of these analyses showed VOCs meeting cleanup criteria.

Samples (when required) will be collected on the weeks shown, at the start of the ON cycle; samples will be collected after running the well pump for 60 minutes; analysis is for VOCs (EPA Method 8240) only.

**Table 4-8**

**French Ltd. Site**
**Groundwater Monitoring Program**
**Quarterly (March '94)**

| Group | Location of Wells | Wells numbers | No of Wells | On-site analyses | | Off-site analyses | | | ARCOC Group | Containers required | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Temp EC pH Diss O2 | TOC | VOA | K | NO3N NH3N OP-P T-P | | Bottle | Preserv. |
| 2 | S1 unit, outside floodwall, n of Gulf pump road | S1-102, -103, -104, -105 | 4 | Q | Q | Q | Q | Q | B | 2-40 ml VOA<br>2-32 oz plast | HCl<br>refrig |
| 3 | INT unit, outside floodwall, N of Gulf pump road | INT-101, -102, -103, -113 | 4 | Q | Q | Q | Q | Q | B | 2-40 ml VOA<br>2-32 oz plast | HCl<br>refrig |
| 4 | S of Gulf pump road,area of S1 injection wells | S1-106, -110 | 2 | Q | Q | Q | Q | Q | B | 2-40 ml VOA<br>2-32 oz plast | HCl<br>refrig |
| 5 | S of Gulf pump road | FLTG-7, -8; S1-108, -111; INT-105, -106, -108, -109, -110, -112 | 10 | Q | Q | Q | Q | Q | B | 2-40 ml VOA<br>2-32 oz plast | HCl<br>refrig |

Q = Analysis to be perfromed quarterly, including semi-annual and annual sampling event.

## 4.5 Data Summary and Discussion

### 4.5.1 Groundwater Production and Injection

Groundwater production increased from 164 to 182 gpm. Groundwater injection increased from 95 to 102 gpm. Increases in flows are attributed to good well and system maintenance (including frequent chlorination at biofouled production wells), limited downtime, and increased injection water availability due to recycling treated groundwater.

### 4.5.2 Groundwater Levels and Flow Directions

Water level readings for the S1 and INT units were measured on March 3. Regional groundwater elevation contours for the S1 and INT units in the groundwater remediation area are presented in Figures 4-6 and 4-7. These figures also show the baseline (December 1991) extent of groundwater contamination. The current extent of contaminated groundwater is contained within the S1 and INT extraction system capture zones.

Water levels at the new INT monitoring wells INT-132 through INT-139 rose between 3 and 12 feet, following resetting control probes at production wells INT-205 through INT-211 on February 22. As previously noted, INT transmissivity appears to be higher than normal in this area. As summarized in the following table, production from wells INT-205 through INT-211 dropped from 16.6 gpm to 9.5 gpm following the probe resetting. Despite this decrease, pumping from INT wells in this area continues to create a large capture zone.

Average Flow Rates (gpm)

| | Jan | Feb | Mar |
|---|---|---|---|
| INT-205 | 1.96 | 1.48 | 0.63 |
| INT-206 | 2.62 | 2.51 | 1.57 |
| INT-207 | 2.54 | 1.95 | 0.71 |
| INT-208 | 3.95 | 2.80 | 1.51 |
| INT-209 | 0.56 | 0.59 | 0.51 |
| INT-210 | 2.88 | 3.50 | 2.93 |
| INT-211 | 2.12 | 2.31 | 1.62 |
| Total | 16.63 | 15.14 | 9.48 |

Normalized to January Flows

| | Jan | Feb | Mar |
|---|---|---|---|
| INT-205 | 100% | 76% | 32% |
| INT-206 | 100% | 96% | 60% |
| INT-207 | 100% | 77% | 28% |
| INT-208 | 100% | 71% | 38% |
| INT-209 | 100% | 105% | 91% |
| INT-210 | 100% | 122% | 102% |
| INT-211 | 100% | 109% | 76% |
| Total | 100% | 91% | 57% |

Figure 4-6

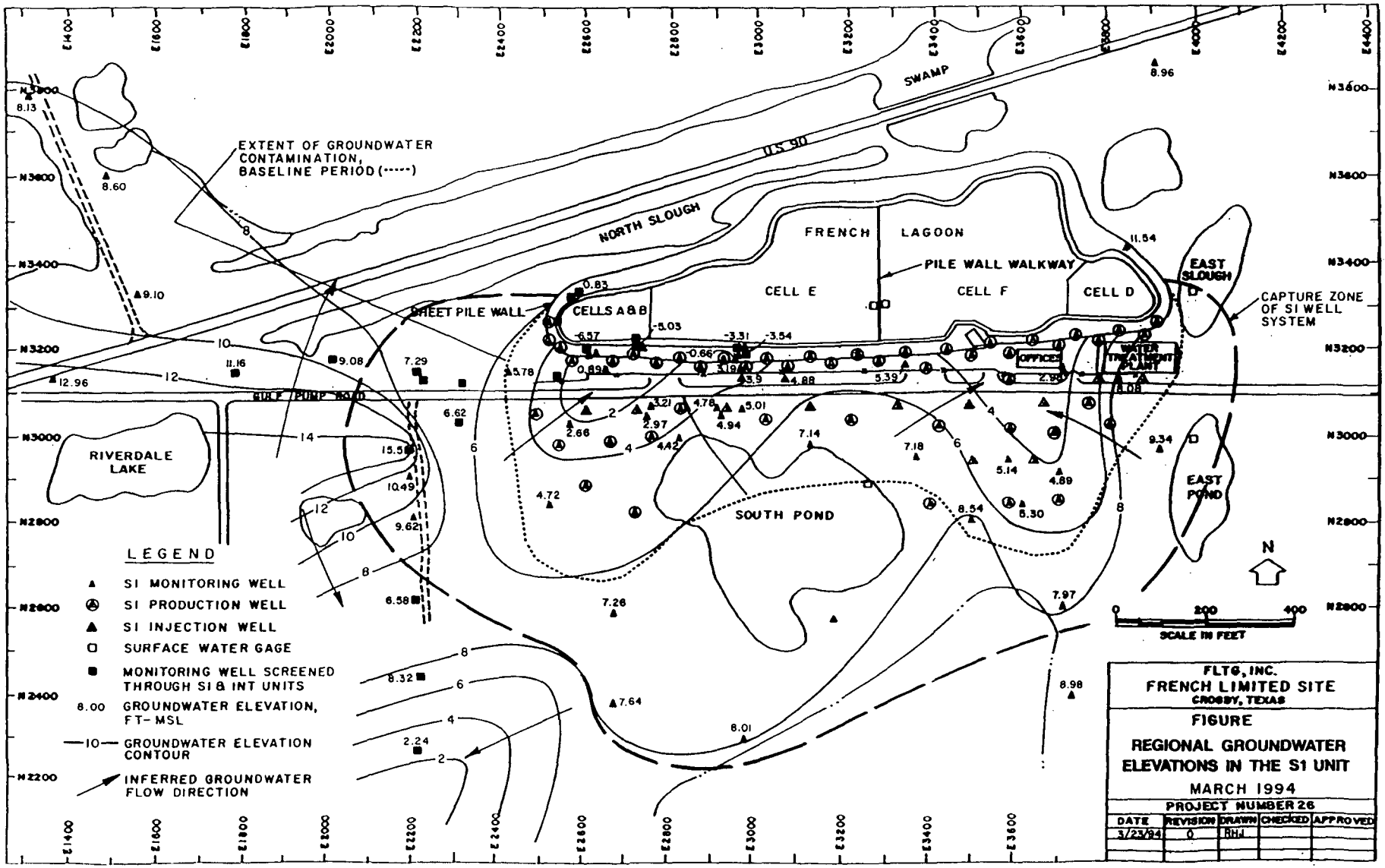
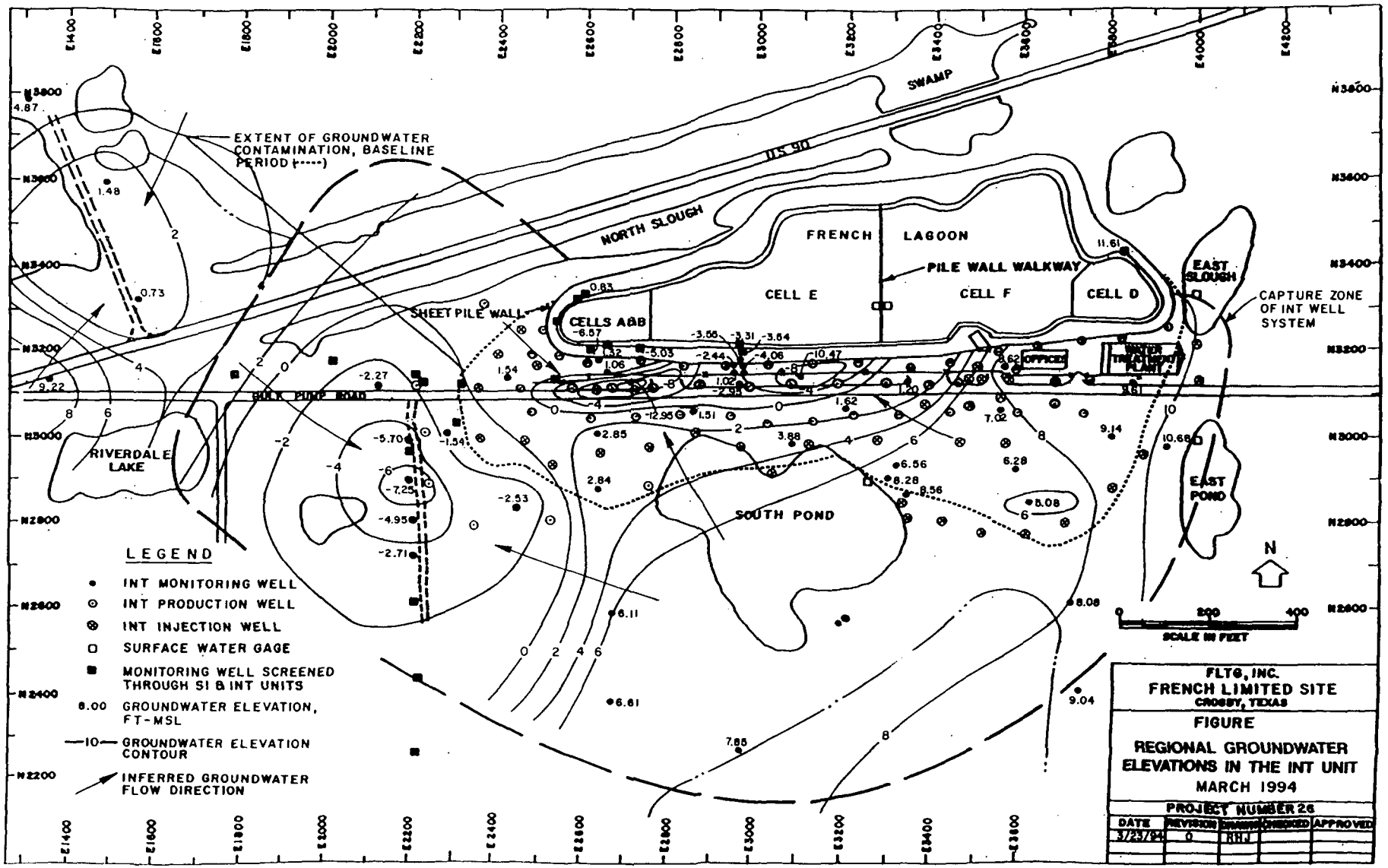

EXTENT OF GROUNDWATER CONTAMINATION, BASELINE PERIOD (·····)
SWAMP
U.S. 90
NORTH SLOUGH
FRENCH LAGOON
PILE WALL WALKWAY
CELL E
CELL F
CELL D
CELLS A & B
SHEET PILE WALL
EAST SLOUGH
CAPTURE ZONE OF SI WELL SYSTEM
OFFICES
WATER TREATMENT PLANT
RIVERDALE LAKE
SOUTH POND
EAST POND
RICE PUMP ROAD
LEGEND
SI MONITORING WELL
SI PRODUCTION WELL
SI INJECTION WELL
SURFACE WATER GAGE
MONITORING WELL SCREENED THROUGH SI & INT UNITS
8.00 GROUNDWATER ELEVATION, FT-MSL
10 GROUNDWATER ELEVATION CONTOUR
INFERRED GROUNDWATER FLOW DIRECTION
N
0 200 400
SCALE IN FEET
FLTG, INC.
FRENCH LIMITED SITE
CROSBY, TEXAS
FIGURE
REGIONAL GROUNDWATER ELEVATIONS IN THE S1 UNIT
MARCH 1994
PROJECT NUMBER 26
DATE 3/23/94
REVISION 0
DRAWN RHJ
CHECKED
APPROVED

Figure 4-7


EXTENT OF GROUNDWATER CONTAMINATION, BASELINE PERIOD (-----)
SWAMP
US 90
NORTH SLOUGH
FRENCH LAGOON
PILE WALL WALKWAY
CELL E
CELL F
CELL D
EAST SLOUGH
CAPTURE ZONE OF INT WELL SYSTEM
SHEET PILE WALL
CELLS A&B
OFFICES
WATER TREATMENT PLANT
BULK PUMP ROAD
RIVERDALE LAKE
SOUTH POND
EAST POND
LEGEND
INT MONITORING WELL
INT PRODUCTION WELL
INT INJECTION WELL
SURFACE WATER GAGE
MONITORING WELL SCREENED THROUGH SI & INT UNITS
8.00 GROUNDWATER ELEVATION, FT-MSL
10 GROUNDWATER ELEVATION CONTOUR
INFERRED GROUNDWATER FLOW DIRECTION
N
0 200 400
SCALE IN FEET
FLTG, INC.
FRENCH LIMITED SITE
CROSBY, TEXAS
FIGURE
REGIONAL GROUNDWATER ELEVATIONS IN THE INT UNIT
MARCH 1994
PROJECT NUMBER 26
DATE 3/23/94
REVISION 0
DRAWN RHJ
CHECKED
APPROVED

### 4.5.3 TOC in shallow groundwater

Samples were collected from 96 out of 99 production wells on March 4 and 5 for TOC analyses on-site. Summaries of TOC concentrations from the start of remediation to date for each unit are presented in Tables 4-9 and 4-10. TOC contour maps are presented in Figures 4-8 and 4-9. TOC distributions in both units were generally similar to February. The large decrease at S1-38 may reflect a bounceback effect followed by a decrease caused by pulse pumping. The history of daily flows, TOC concentration, and TOC input to T-101 is presented in Table 4-2. On-site TOC analyses (used to generate Tables 4-2, 4-9, and 4-10) measure non-purgeable organic carbon.

### 4.5.4 In-Situ Bioremediation

No major changes in in-situ bioremediation system operation or response occurred in March. The emphasis continues to be to maximize delivery of oxygen and nutrients to the INT system. The additional INT wells being installed in the western area should assist in this goal. Oxygen delivery continues to be evidenced by higher-than-ambient DO concentrations at certain monitoring wells (see Figures 4-10 and 4-11), but is not widespread over the shallow aquifer.

## 4.6 Schedule

The program of installation of additional INT unit monitoring, injection, and production wells in the landfill area, and S1 unit injection and production wells in the S1-13 and S1-16 areas outside the floodwall, started on March 15 and will continue through April.

## Table 4-9

HISTORY OF TOC CONCENTRATIONS
AT S1 PRODUCTION WELLS

| Well ID | Baseline Nov-Dec 91 (ppm) | Maximum Feb-Dec 92 (ppm) | Minimum 1993 (ppm) | Maximum 1993 (ppm) | Average 1993 (ppm) | Jan 1994 (ppm) | Feb 1994 (ppm) | Mar 1994 (ppm) |
|---|---|---|---|---|---|---|---|---|
| S1-1 | 290 | 475 | 390 | 910 | 634 | 1025 | 1150 | 1317 |
| S1-2 | 190 | 796 | 460 | 1204 | 832 | 1037 | 909 | 1510 |
| S1-3 | 370 | 1071 | 384 | 1610 | 862 | 1090 | 1120 | 1037 |
| S1-4 | 47 | 866 | 560 | 1044 | 786 | 848 | 1300 | 1025 |
| S1-5 | 51 | 646 | 548 | 950 | 714 | 1079 | 624 | 1151 |
| S1-6 | 51 | 800 | 482 | 1084 | 816 | 1202 | 1340 | 1315 |
| S1-7 | 200 | 787 | 710 | 1084 | 879 | NS | 1290 | 1327 |
| S1-8 | 64 | 927 | 465 | 1072 | 769 | 1118 | 1290 | 1516 |
| S1-9 | 77 | 506 | 225 | 1530 | 830 | 1809 | 2020 | 2085 |
| S1-10 | 46 | 214 | 147 | 2105 | 1381 | 2251 | 2610 | 2540 |
| S1-11 | 120 | 281 | 270 | 1848 | 1193 | 2004 | 2210 | NS |
| S1-12 | 140 | 1002 | 585 | 2260 | 1200 | 2313 | 2390 | 2129 |
| S1-13 | 520 | 894 | 404 | 760 | 598 | 771 | 930 | 990 |
| S1-14 | 590 | 1730 | 626 | 2304 | 1214 | 1502 | 1077 | 1616 |
| S1-15 | 5300 | 4910 | 336 | 3696 | 2374 | 3373 | 2756 | 2778 |
| S1-16 | 8900 | 8900 | 180 | 3122 | 1651 | NS | 2056 | 2732 |
| S1-17 | 6800 | 5550 | 405 | 1106 | 750 | 627 | 388 | 344 |
| S1-18 | 2200 | 2043 | 52 | 196 | 112 | 90 | 101 | 44 |
| S1-19 | 20 | 914 | 53 | 220 | 110 | 26 | 37 | 33 |
| S1-20 | 120 | 1360 | 60 | 192 | 126 | 25 | 95 | 141 |
| S1-21 | 65 | 418 | 23 | 1020 | 134 | 113 | 48 | 17 |
| S1-22 | 290 | 1080 | 8 | 1010 | 123 | 12 | 6 | 4 |
| S1-23 | 350 | 234 | 7 | 1315 | 137 | 24 | 14 | 27 |
| S1-24 | 250 | 240 | 16 | 200 | 52 | 25 | 16 | 16 |
| S1-25 | 550 | 660 | 11 | 91 | 35 | 26 | 16 | 16 |
| S1-26 | 540 | 575 | 14 | 84 | 34 | 25 | 25 | 22 |
| S1-27 | 220 | 219 | 52 | 400 | 119 | 51 | 62 | 60 |
| S1-28 | 370 | 520 | 11 | 380 | 64 | 275 | 29 | 12 |
| S1-29 | 670 | 496 | 16 | 182 | 47 | 50 | 62 | 23 |
| S1-30 | 370 | 711 | 27 | 604 | 113 | 51 | 50 | 78 |
| S1-31 | 14 | 712 | 15 | 70 | 34 | 0 | 57 | 29 |
| S1-32 | 18 | 347 | 30 | 910 | 185 | 100 | 132 | 85 |
| S1-33 | 10 | 30 | 12 | 55 | 30 | 101 | 99 | 16 |
| S1-34 | 11 | 50 | 24 | 94 | 50 | 79 | 90 | 75 |
| S1-35 | 24 | 154 | 22 | 95 | 68 | 25 | 43 | 45 |
| S1-36 | 200 | 162 | 10 | 106 | 56 | 60 | 49 | 44 |
| S1-37 | 13 | 71 | 12 | 180 | 44 | 50 | 52 | 55 |
| S1-38 | 59 | 73 | 1 | 52 | 21 | NS | 1540 | 6 |
| S1-39 | 290 | 414 | 17 | 96 | 35 | 15 | 25 | 22 |
| S1-40 | 150 | 210 | 25 | 268 | 70 | 38 | 25 | 33 |
| S1-41 | 170 | 116 | 14 | 84 | 31 | 1 | 48 | 12 |
| S1-42 | 88 | 103 | 5 | 35 | 17 | 0 | 11 | 37 |
| S1-43 | 4 | 36 | 6 | 50 | 24 | 1 | 21 | NS |
| S1-44 | 280 | 204 | 9 | 45 | 25 | 25 | 19 | 44 |
| S1-45 | 4400 | 588 | 14 | 174 | 51 | 37 | 20 | 30 |
| S1-46 | 480 | 462 | 4 | 76 | 18 | 1 | 11 | 10 |
| S1-47 | 1200 | 1390 | 25 | 155 | 79 | 150 | 72 | 61 |
| S1-48 | 1200 | 1505 | 15 | 133 | 52 | 50 | 34 | 31 |
| S1-60 | 48 | 91 | 8 | 126 | 28 | 25 | 11 | 15 |

NS = Not Sampled

## Table 4-10

HISTORY OF TOC CONCENTRATIONS
AT INT PRODUCTION WELLS

| Well ID | Baseline Nov-Dec 91 (ppm) | Maximum Feb-Dec 92 (ppm) | Minimum 1993 (ppm) | Maximum 1993 (ppm) | Average 1993 (ppm) | Jan 1994 (ppm) | Feb 1994 (ppm) | Mar 1994 (ppm) |
|---|---|---|---|---|---|---|---|---|
| INT-1 | 3600 | 3600 | 460 | 1584 | 1029 | 1050 | 718 | 800 |
| INT-2 | 1800 | 1120 | 215 | 900 | 414 | 174 | 230 | 290 |
| INT-3 | 5200 | 2030 | 218 | 1935 | 1389 | 2080 | 1926 | 1188 |
| INT-4 | 610 | 928 | 330 | 793 | 526 | 587 | 1300 | 1300 |
| INT-5 | 960 | 1689 | 190 | 536 | 356 | 263 | 248 | 205 |
| INT-6 | 280 | 973 | 90 | 1140 | 556 | 720 | 451 | 510 |
| INT-7 | 100 | 245 | 24 | 1100 | 308 | 99 | 74 | 99 |
| INT-8 | 75 | 666 | 24 | 196 | 90 | 112 | 103 | 84 |
| INT-9 | 800 | 1413 | 101 | 358 | 178 | 188 | 174 | 142 |
| INT-10 | 1900 | 1328 | 57 | 186 | 109 | 100 | 93 | 112 |
| INT-11 | 590 | 1816 | 80 | 171 | 117 | 175 | 186 | NS |
| INT-12 | 3300 | 1820 | 141 | 1255 | 399 | 364 | 239 | 108 |
| INT-13 | 590 | 924 | 40 | 251 | 122 | 99 | 67 | 63 |
| INT-14 | 24 | 1026 | 58 | 492 | 266 | 226 | 154 | 112 |
| INT-15 | 19 | 1760 | 9 | 38 | 20 | 12 | 34 | 20 |
| INT-16 | 2000 | 2230 | 6 | 147 | 28 | 13 | 12 | 15 |
| INT-17 | 7 | 252 | 39 | 184 | 81 | 152 | 25 | 13 |
| INT-18 | 4 | 129 | 139 | 270 | 183 | 225 | 230 | 162 |
| INT-19 | 1400 | 1800 | 52 | 332 | 158 | 112 | 76 | 55 |
| INT-20 | 3500 | 3742 | 901 | 3141 | 2123 | 2147 | 1960 | 2525 |
| INT-21 | 29 | 301 | 130 | 325 | 260 | 362 | 327 | 240 |
| INT-22 | 8 | 68 | 18 | 76 | 45 | 43 | 58 | 55 |
| INT-23 | 16 | 74 | 43 | 112 | 73 | 48 | 53 | 40 |
| INT-24 | 240 | 434 | 38 | 472 | 293 | 202 | 174 | 136 |
| INT-25 | 36 | 376 | 58 | 272 | 169 | 75 | 60 | 65 |
| INT-26 | 120 | 970 | 143 | 837 | 430 | 203 | 173 | 152 |
| INT-27 | 180 | 324 | 107 | 268 | 196 | 75 | 109 | 116 |
| INT-28 | 630 | 648 | 57 | 288 | 200 | 187 | 80 | 48 |
| INT-29 | 1100 | 1120 | 74 | 450 | 245 | 162 | 130 | 104 |
| INT-30 | 1400 | 606 | 43 | 294 | 129 | 112 | 60 | 32 |
| INT-31 | 70 | 540 | 29 | 120 | 62 | 12 | 67 | 52 |
| INT-32 | 880 | 470 | 48 | 208 | 119 | 124 | 26 | 16 |
| INT-33 | 120 | 1710 | 25 | 1620 | 910 | 1374 | 1006 | 255 |
| INT-55 | NS | NS | 53 | 53 | 53 | 235 | 113 | 115 |
| INT-56 | NS | NS | 668 | 668 | 668 | 901 | 824 | 925 |
| INT-57 | NS | NS | 28 | 28 | 28 | 12 | 29 | 40 |
| INT-58 | NS | NS | 102 | 102 | 102 | 10 | 94 | 76 |
| INT-59 | NS | NS | 121 | 121 | 121 | 100 | 104 | 115 |
| INT-60 | NS | NS | 172 | 172 | 172 | 201 | 169 | 195 |
| INT-61 | NS | NS | 56 | 56 | 56 | 79 | 80 | 95 |
| INT-62 | NS | NS | 52 | 52 | 52 | 75 | 197 | 100 |
| INT-66 | NS | NS | 114 | 114 | 114 | 125 | 132 | 175 |
| INT-205 | NS | NS | 31 | 31 | 31 | 39 | 132 | 120 |
| INT-206 | NS | NS | 24 | 24 | 24 | 218 | 48 | 44 |
| INT-207 | NS | NS | 66 | 66 | 66 | 101 | 71 | 56 |
| INT-208 | NS | NS | 27 | 27 | 27 | 19 | 53 | 20 |
| INT-209 | NS | NS | 35 | 35 | 35 | 40 | 62 | 52 |
| INT-210 | NS | NS | 36 | 36 | 36 | 42 | 48 | 24 |
| INT-211 | NS | NS | 109 | 109 | 109 | 151 | 127 | 88 |

NS = Not Sampled

Figure 4-8

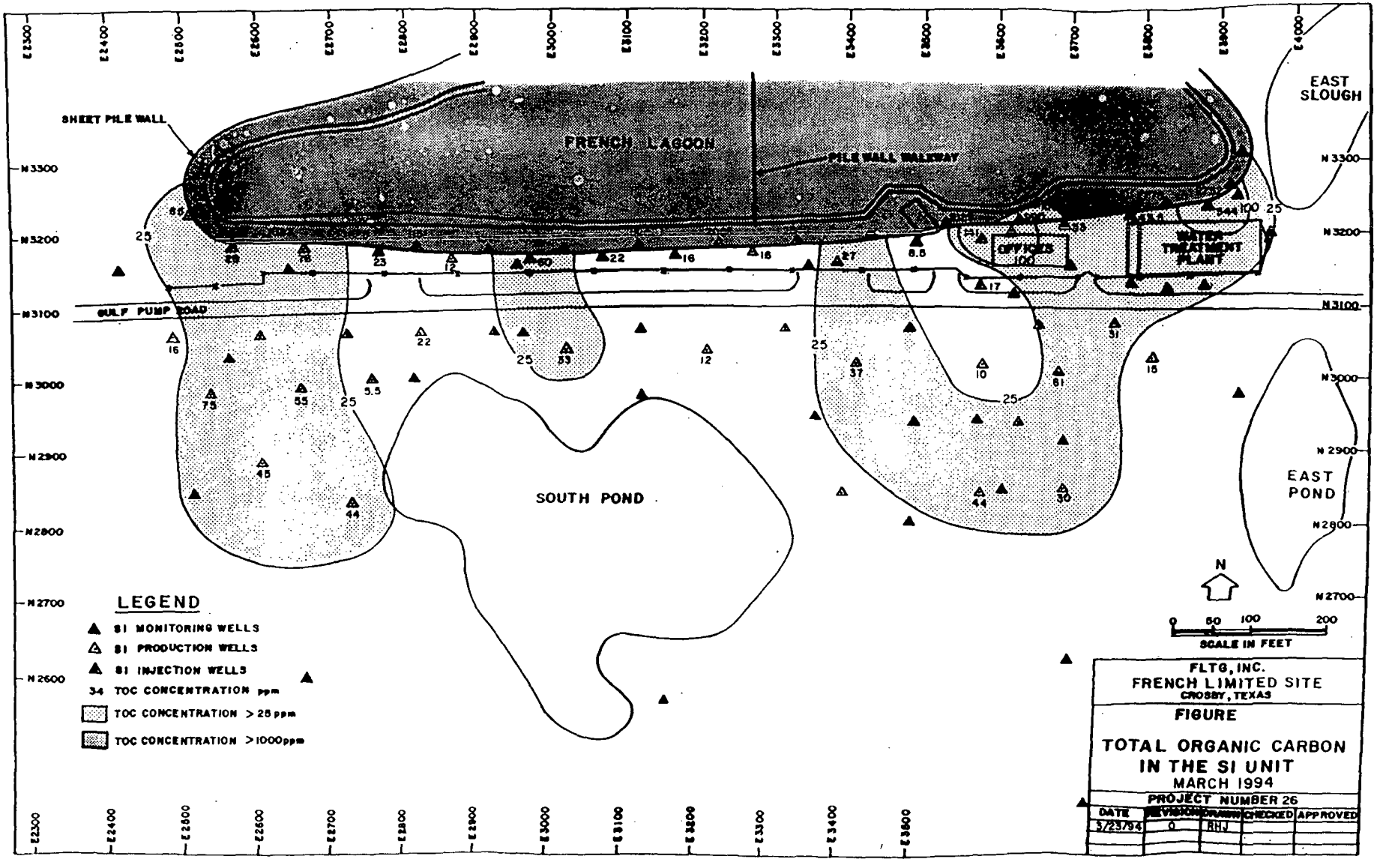

SHEET PILE WALL
FRENCH LAGOON
PILE WALL WALKWAY
EAST SLOUGH
GULF PUMP ROAD
SOUTH POND
EAST POND
OFFICES
WATER TREATMENT PLANT
N3300
N3200
N3100
N3000
N2900
N2800
N2700
N2600
LEGEND
SI MONITORING WELLS
SI PRODUCTION WELLS
SI INJECTION WELLS
34 TOC CONCENTRATION ppm
TOC CONCENTRATION > 25 ppm
TOC CONCENTRATION > 1000ppm
N
0 50 100 200
SCALE IN FEET
FLTG, INC.
FRENCH LIMITED SITE
CROSBY, TEXAS
FIGURE
TOTAL ORGANIC CARBON
IN THE SI UNIT
MARCH 1994
PROJECT NUMBER 26
DATE
REVISION
DRAWN
CHECKED
APPROVED
3/23/94
0
RHJ

**Figure 4-9**

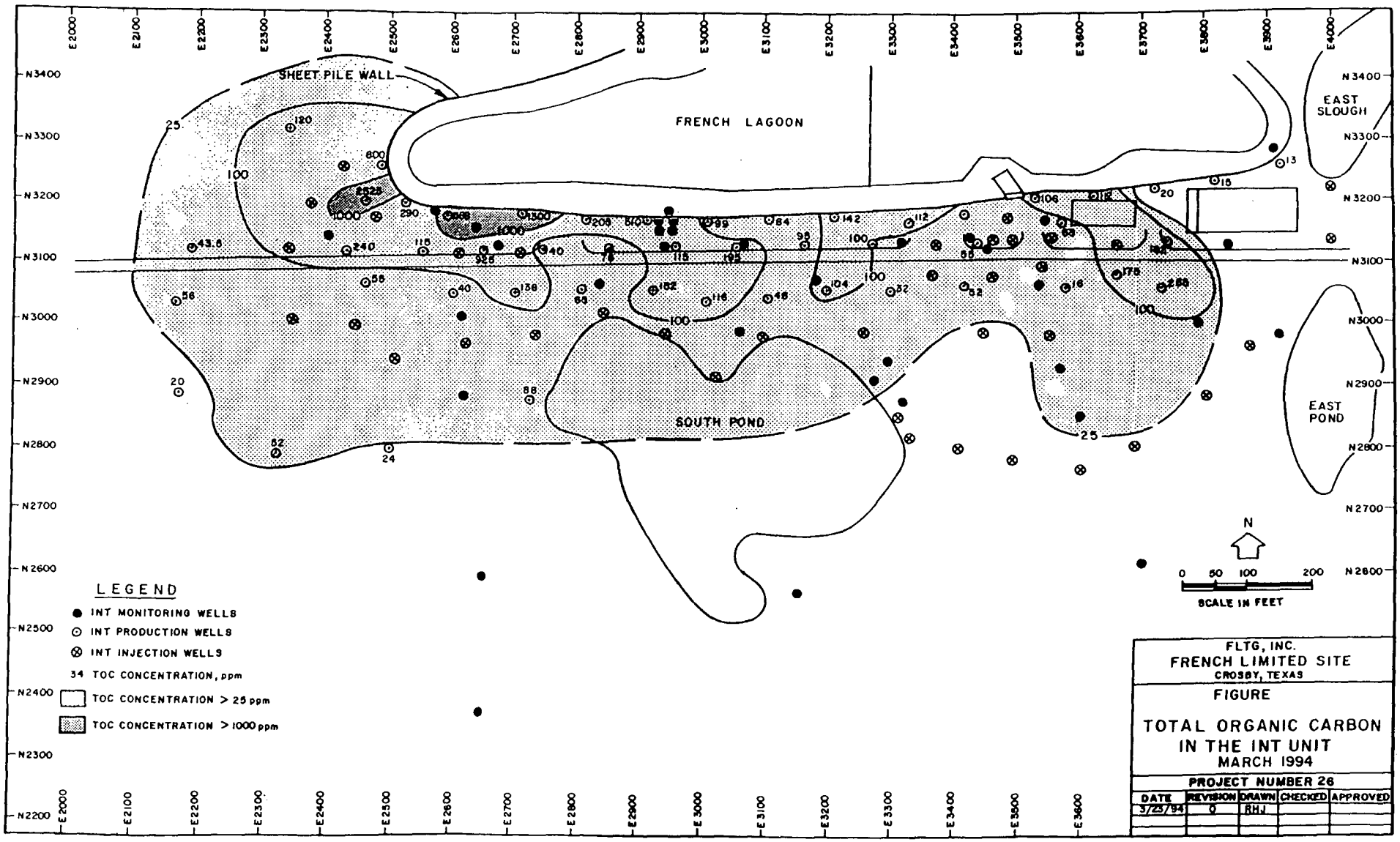

SHEET PILE WALL
FRENCH LAGOON
EAST SLOUGH
EAST POND
SOUTH POND
LEGEND
INT MONITORING WELLS
INT PRODUCTION WELLS
INT INJECTION WELLS
34 TOC CONCENTRATION, ppm
TOC CONCENTRATION > 25 ppm
TOC CONCENTRATION > 1000 ppm
N
0 50 100 200
SCALE IN FEET
FLTG, INC.
FRENCH LIMITED SITE
CROSBY, TEXAS
FIGURE
TOTAL ORGANIC CARBON IN THE INT UNIT
MARCH 1994
PROJECT NUMBER 26
DATE 3/25/94
REVISION 0
DRAWN RHJ
CHECKED
APPROVED

Figure 4-10

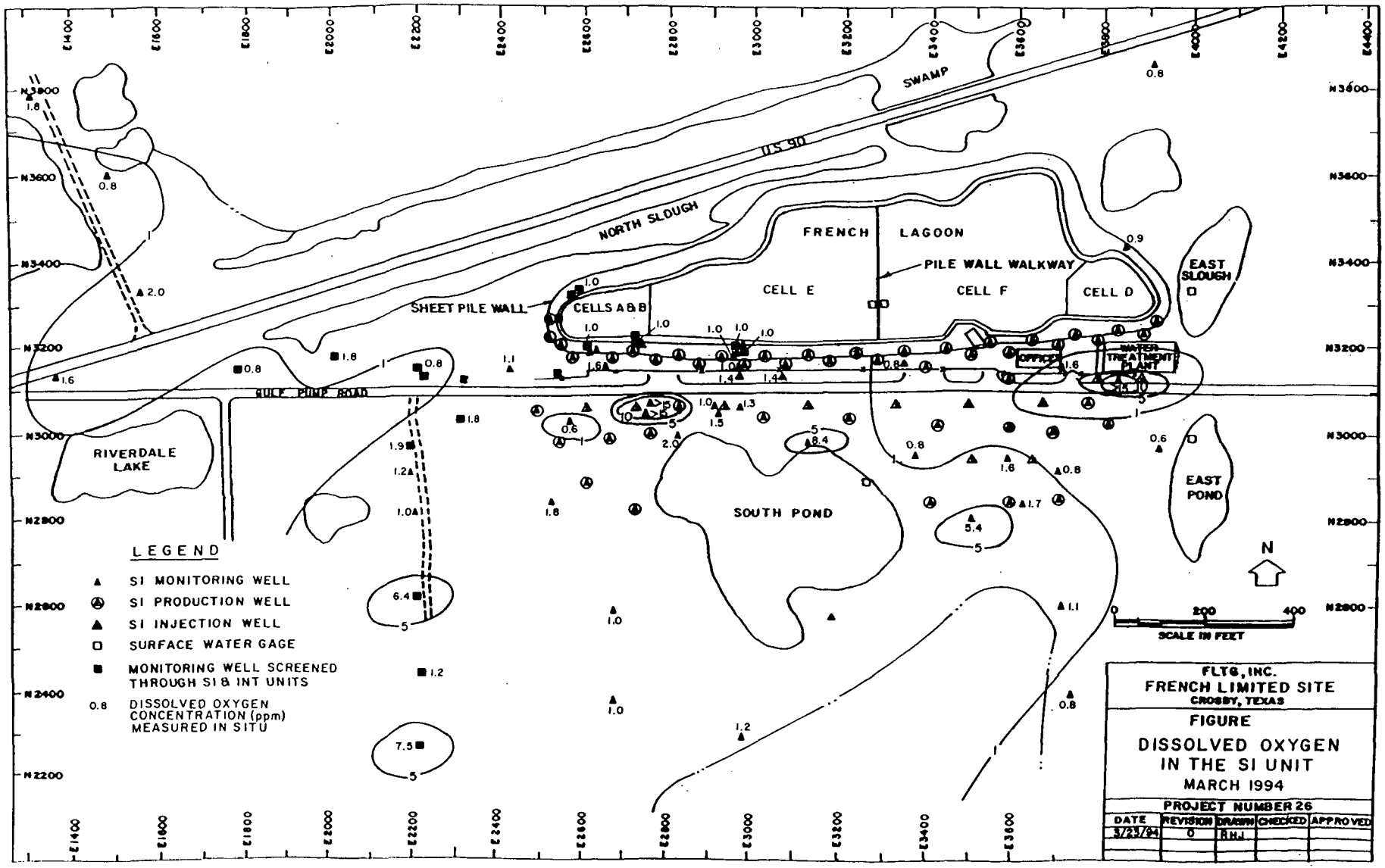
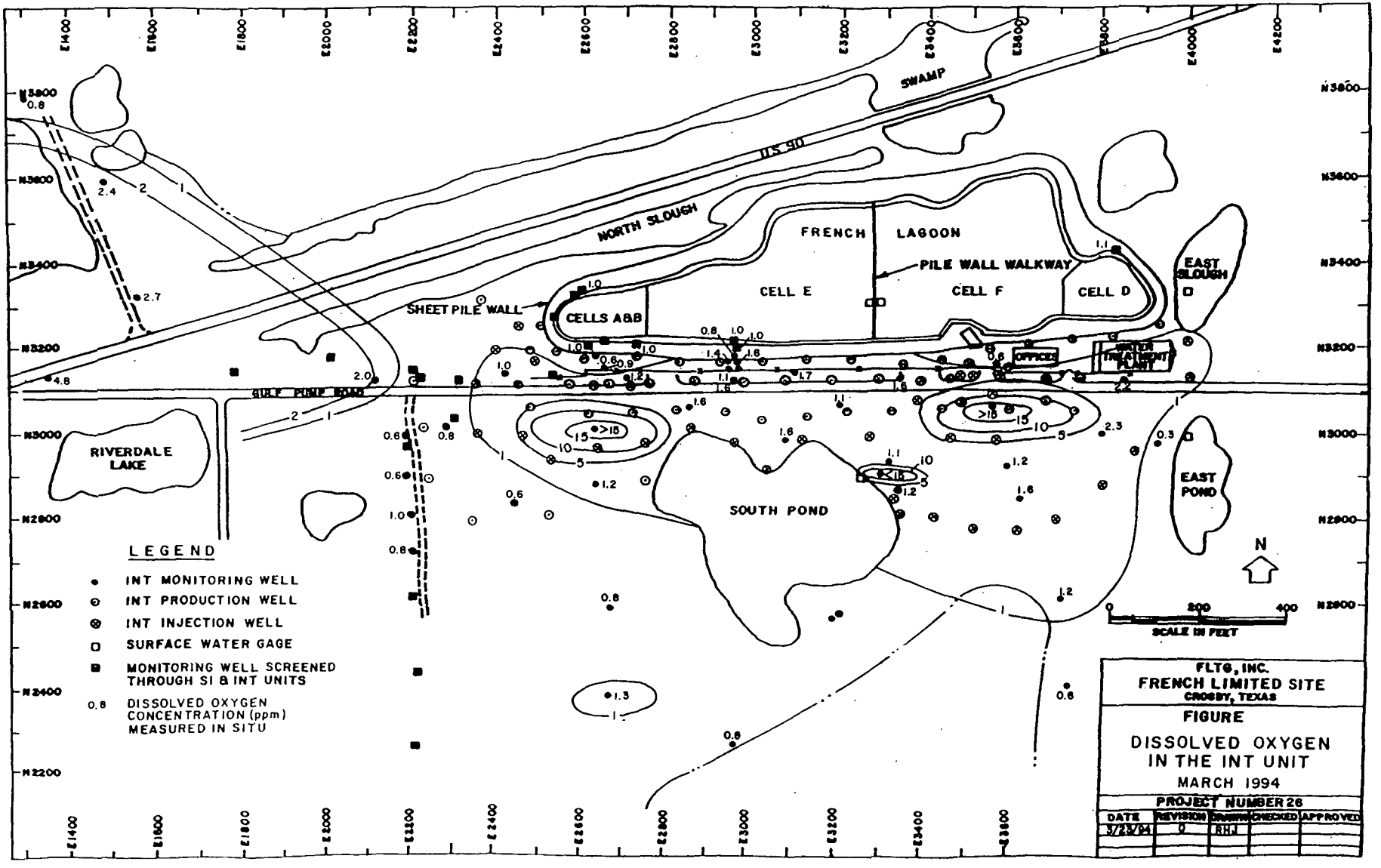

SWAMP
US 90
NORTH SLOUGH
FRENCH LAGOON
PILE WALL WALKWAY
SHEET PILE WALL
CELLS A&B
CELL E
CELL F
CELL D
EAST SLOUGH
OFFICE
WATER TREATMENT PLANT
GULF PUMP ROAD
RIVERDALE LAKE
SOUTH POND
EAST POND
LEGEND
SI MONITORING WELL
SI PRODUCTION WELL
SI INJECTION WELL
SURFACE WATER GAGE
MONITORING WELL SCREENED THROUGH SI & INT UNITS
DISSOLVED OXYGEN CONCENTRATION (ppm) MEASURED IN SITU
N
0 200 400
SCALE IN FEET
FLTG, INC.
FRENCH LIMITED SITE
CROSBY, TEXAS
FIGURE
DISSOLVED OXYGEN IN THE SI UNIT
MARCH 1994
PROJECT NUMBER 26
DATE 3/23/94
REVISION 0
DRAWN RHJ
CHECKED
APPROVED

Figure 4-11


SWAMP
U.S. 90
NORTH SLOUGH
FRENCH LAGOON
PILE WALL WALKWAY
CELL E
CELL F
CELL D
CELLS A&B
SHEET PILE WALL
EAST SLOUGH
OFFICES
WATER TREATMENT PLANT
GULF PUMP ROAD
RIVERDALE LAKE
SOUTH POND
EAST POND
LEGEND
INT MONITORING WELL
INT PRODUCTION WELL
INT INJECTION WELL
SURFACE WATER GAGE
MONITORING WELL SCREENED THROUGH SI & INT UNITS
0.8 DISSOLVED OXYGEN CONCENTRATION (ppm) MEASURED IN SITU
N
200
400
SCALE IN FEET
FLTG, INC.
FRENCH LIMITED SITE
CROSBY, TEXAS
FIGURE
DISSOLVED OXYGEN IN THE INT UNIT
MARCH 1994
PROJECT NUMBER 26
DATE 3/23/94
REVISION 0
DRAWN RHJ
CHECKED
APPROVED

## ATTACHMENT 4A

**Soil Boring Log and Well Construction Details**

# Well: INT-143

## SOIL BORING LOG

Driller: Ruperto Aguilar (Layne)
Drilled: 3/24/94
Project: INT-11 DNAPL Area

Geologist: Jim Thomson (AHA)
Site: French Limited, Crosby, Texas
Task: 10

| Depth (ft) | OVM | Lithology |
|---|---|---|
| 0 - ~16 | 0 ppm | **SANDY CLAY (UNC)**, dark brown, no odor; no samples: cuttings logged from 0 to 20'<br><br>@8', moist |
| ~16 - 33 | 0 ppm | **SAND (S1)**, fine to coarse, light tan, no odor or staining; no DNAPL; top contact uncertain: logged below 20'<br><br>@ 20 - 21.6', CLAY, red mottled gray, stiff<br>@ 21.6 - 33', SAND |
| 33 - 34.6 | 0 -7 ppm | **CLAY (C1)**, red mottled gray, stiff, no odor or staining; no DNAPL |
| 34.6 - 50 | 0 - 0.8 ppm | **SILTY SAND AND SILT, interbedded (INT)**; SAND, fine, silty, light tan; SILT, clayey to sandy, light tan, mostly no odor or staining; thin (<0.25 ft) to finely laminated; no DNAPL<br><br>@ 36 - 39.5', mainly SILT, slight odor; staining at 39 - 39.5'; higher OVM (0 - 31 ppm)<br>@ 39.5-42', mainly SAND, coarse 2 mm layer stained at 41.75'<br>@ 42 - 43', SAND<br>@ 45 - 50', speckled Fe staining<br>@ 49', 2 mm gray CLAY |
| 50 - 52 | 19 - 38 ppm | CLAY (C2), gray patched red-brown, stiff to very stiff; occasional black and Fe staining on partings and slickensides, notably at 51.5 - 52'; no DNAPL |

# Well: INT-143

## WELL CONSTRUCTION DETAILS

Driller: Ruperto Aguilar (Layne)
Drilled: 3/24/94
Project: INT-11 DNAPL Area

Geologist: Jim Thomson (AHA)
Site: French Limited, Crosby, Texas
Task: 10

| | | |
|---|---|---|
| Depth: | 52' | |
| Stickup: | 5 ft (approx.) | |
| Casing: | 35' x 4" PVC Sch 40 | 0 - 35' |
| Screen: | 15' x 4" wire-wrapped stainless steel; 010 slot | 35 - 50' |
| Sump: | 2' x 4" PVC Sch 40 | 50 - 52' |
| Surface seal: | bentonite cement grout | 0 - 31' |
| Upper seal: | bentonite pellets | 31 - 33' |
| Sand: | 20/40 | 33 - 50' |
| Lower seal: | bentonite pellets (frozen) | 50 - 52' |

## ATTACHMENT 4B

**Refinement Notice RN-76**

FRENCH LIMITED REMEDIATION PROJECT

# REFINEMENT NOTIFICATION

**Number: RN-076**

**Date: 03-17-94**

**By: J. Thomson**

**DESCRIPTION OF REFINEMENT:**

GROUNDWATER MONITORING PROGRAM

The following analytical parameters will not be performed for the March, 1994, sampling event:

Field Parameters: Nutrients

Lab Parameters: TOC, TOC-FLTG, TIC, TOX, TPH, cations except K, anions, semi-volatiles

The amended March, 1994, program is attached.

**JUSTIFICATION FOR REFINEMENT:**

The primary purpose of the March, 1994, sampling event is to track remedial progress and identify areas that may require enhanced bioremediation. Justification for not performing specific analyses follows:

| | |
|---|---|
| Nutrients | Field analyses are less accurate than lab analyses, which continue |
| TOC | Field TOC correlates well with lab results; lab analyses are redundant. |
| TOC-FLTG/TIC/TOX/TPH | Indirect indicators of cleanup parameters; no longer useful for analysis of remedial progress. |
| Cations and anions | Indirect indicators of injection water; only potassium (K) is now useful. |
| Semi-volatiles | Generally not detected or well below cleanup criteria in December, 1993, results; semi-volatile compounds migrate slowly relative to volatile compounds; little change from December results is expected. |

**REFERENCE DOCUMENT:** Shallow Aquifer and Subsoil Remediation Facilities Design Report, Vol. I, Appendix A

**SUPPORTING INFORMATION:** None

**IMPACTS:**

| | |
|---|---|
| **Remedial Effectiveness:** | Will reduce analytical time and speed response actions. |
| **Operations and Maintenance:** | No impact, will reduce monitoring costs. |
| **Construction Schedule:** | No impact. |
| **Construction Cost:** | Not applicable. |

**APPROVALS:**

FLTG Project Coordinator: _____ Date: _____

EPA Project Manager: Judith R Black Date: 3-22-94

**DISTRIBUTION OF APPROVED NOTIFICATION:**

| | | |
|---|---|---|
| EPA - Judith Black | File | |
| CH2M Hill-J. McLeod | | |
| TNRCC - James Sher | | |

**French Ltd. Site**
**Groundwater Monitoring Program**
**Quarterly (March '94)**

| Group | Location of Wells | Wells numbers | No of Wells | On-site analyses | | Off-site analyses | | | ARCOC Group | Containers required | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Temp EC pH Diss O2 | TOC | VOA | K | NO3N NH3N OP-P T-P | | Bottle | Preserv. |
| 2 | S1 unit, outside floodwall, n of Gulf pump road | S1-102, -103, -104, -105 | 4 | Q | Q | Q | Q | Q | B | 2-40 ml VOA<br>2-32 oz plast | HCl<br>refrig |
| 3 | INT unit, outside floodwall, N of Gulf pump road | INT-101, -102, -103, -113 | 4 | Q | Q | Q | Q | Q | B | 2-40 ml VOA<br>2-32 oz plast | HCl<br>refrig |
| 4 | S of Gulf pump road,area of S1 injection wells | S1-106, -110 | 2 | Q | Q | Q | Q | Q | B | 2-40 ml VOA<br>2-32 oz plast | HCl<br>refrig |
| 5 | S of Gulf pump road | FLTG-7, -8; S1-108, -111; INT-105, -106, -108, -109, -110, -112 | 10 | Q | Q | Q | Q | Q | B | 2-40 ml VOA<br>2-32 oz plast | HCl<br>refrig |

Q = Analysis to be perfromed quarterly, including semi-annual and annual sampling event.

# French, Ltd. Project

FLTG, Incorporated

15010 FM 2100, SUITE 200, CROSBY, TEXAS 77532
R. L. SLOAN, PROJECT COORDINATOR
PHONE 713-328-3541 FAX 713-328-4687

March 21, 1994

Ms. Judith Black
EPA Superfund Coordinator - French
Superfund Compliance Section (6H-ET)
USEPA
1445 Ross Avenue
Dallas, Texas 75202-2733

Re: Refinement Notice #RN-076, Quarterly Groundwater Monitoring

Dear Ms. Black:

RN-076 proposes to focus the quarterly groundwater sampling on those wells and parameters necessary to track remedial progress and to identify areas that may benefit from enhanced bioremediation.

Please contact me if you have any questions or comments.

Sincerely,

R. L. Sloan

R.L. Sloan

RS/ks

cc: James Sher
John McLeod

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

MAR 2 2 1994

Mr. Richard L. Sloan
FLTG, Inc.
15010 FM 2100 Suite 200
Crosby, Texas 77531

Re: French Limited Superfund Site
Design Refinement Notice 076
Treated Water Discharge Criteria

Dear Mr. Sloan:

The Agency has completed its technical review of the Refinement Notice 076 that you recently submitted for EPA approval. The Refinement Notice is herein approved. Approval of this Notice does not release FLTG, Inc. or any responsible party from liability should the remedy fail to perform as expected at the French Limited Site.

Should you have any questions, please call me at (214) 655-6739.

Sincerely yours,

Judith R. Black
Project Coordinator

enclosures

cc: Jim Sher - TWC
Jon McLeod - CH2M Hill

# 5.0 GROUNDWATER TREATMENT PLANT

## 5.1 Summary of Activities

With the GWT plant permit amended to 30 day averaging for discharge standards, operations concentrated on activating the carbon filter blending system on March 4.

Initially, low set points were calibrated into the controller until sufficient laboratory data had been reviewed to get a "feel" for daily grabs and the effects it would have in case of a plant upset with a possible spike in one or more of the parameters. As evidenced by Table 5-2 a gradual increase is being recorded in most standards.

Flows through the blending valve started at 15 gpm for ten days until laboratory analysis revealed that higher volumes could be tolerated without an excursion.

At the present time the blending system is bypassing 110 gpm or 55% of the process water.

Since the new analytical laboratory has taken over the contract for Treated Water Analysis, faster response time is anticipated for further valve adjustment.

There have been no major mechanical failures for the month of March.

The new T.O.C. analyzer/sampling building was installed in March which affords better temperature and humidity control that affects analyzer results.

Total flows for March:

Water discharged to the San Jacinto River - 9,393,900 gallons

Water discharged to the Lagoon - 0 gallons

Sludge discharged to the Lagoon - 45,400 gallons

Water processed through the GWT - 8,094,900 gallons

Water discharged to the South Pond - 0 gallons

Water processed from Cell E to GWT - 3,119,700 gallons
(included in Attachment 5A)

Water blended passed Carbon Filter - 1,610,200 gallons

## 5.2 Inoculum/Nutrient Addition

The following have been introduced into the bioreactors/clarifier:

Nutrients:

945 gallons 11-37-0

Microbes:

16 oz. French Limited Isolated Microbes

Coagulant:

37 gallons Percol 787 Anionic Polymer

## 5.3 Maintenance

Table 5-1 lists the preventive maintenance items performed in March.

## 5.4 Operating Data

1. Operator logs and records are included in Appendix D.

2. Table 5-2 summarizes the laboratory analysis of the treated water discharged to the San Jacinto River.

## TABLE 5-1

### Preventive Maintenance

| Day | Action |
|---|---|
| March 1 | Rotated Sala Pumps. |
| March 4 | Completed inspection of all electrical equipment. |
| March 7 | Rotated Sala Pumps. |
| March 8 | Lubed all equipment in GWT. |
| March 11 | Carbon filter transfer. |
| March 14 | Rotated Sala Pumps. |
| March 17 | Lubed pressure sprayer. |
| March 21 | Rotated Sala Pumps. |
| March 24 | Carbon filter transfer. |
| March 30 | Lubed all equipment in GWT.<br>Lubed Sump Pump in Chemical Storage.<br>Lubed all gate rollers and chain on electric gate.<br>Lubed padlocks on gates.<br>Rotated Sala Pumps. |

## TABLE 5-2
### Treated Water Results Summary

| Collected | Set No. | pH | | TSS | | TOC | | O&G | | Benzene | | Chlor HC's | | Total PCBs | | Napthalene | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (6-9) | | 5 PPM | | 55 PPM | | 15 PPM | | 150 PPB | | 500 PPB | | 0.65 PPB | | 300 PPB | |
| | | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg |
| 2-Dec-93 | M03A0189 | 7.64 | | 1. | | 10. | | 2.75 | | 2.5 | | 14. | | .13 | | 5. | |
| 6-Dec-93 | M03A0190 | 7.99 | | 1. | | .5 | | 2.15 | | 2.5 | | 4. | | .25 | | 5. | |
| 9-Dec-93 | M03A0191 | 7.63 | | 1. | | 5.1 | | 2.15 | | 2.5 | | 8. | | .13 | | 5. | |
| 13-Dec-93 | M03A0192 | 7.5 | | 2. | | 13.3 | | 2.15 | | 2.5 | | 4. | | .25 | | 5. | |
| 16-Dec-93 | M03A0193 | 7.58 | | 2. | | 15. | | 2.15 | | 2.5 | | 50. | | .13 | | 5. | |
| 20-Dec-93 | M03A0194 | 8.13 | | 1.1 | | 1.4 | | 2.15 | | 2.5 | | 50. | | .13 | | 5. | |
| 23-Dec-93 | M03A0195 | 7.82 | | 1. | | 1.8 | | 2.95 | | 2.5 | | 50. | | .13 | | 5. | |
| 27-Dec-93 | M03A0196 | 7.63 | | 1. | | 6.7 | | 2.15 | | 2.5 | | 50. | | .13 | | 5. | |
| 31-Dec-93 | M03A0197 | 7.98 | 7.77 | 1.1 | 1.24 | .5 | 6.03 | 2.3 | 2.32 | 2.5 | 2.5 | 50. | 31.11 | .13 | .15 | 5. | 5. |
| 3-Jan-94 | M03A0198 | 7.8 | 7.78 | 1 | 1.24 | 4.7 | 5.44 | 2.8 | 2.33 | 2.5 | 2.5 | 50. | 35.11 | .13 | .15 | 5. | 5. |
| 6-Jan-94 | M03A0199 | 7.78 | 7.76 | 1. | 1.24 | .5 | 5.44 | 2.65 | 2.38 | 2.5 | 2.5 | 50. | 40.22 | .13 | .14 | 5. | 5. |
| 10-Jan-94 | M03A0200 | 8.21 | 7.83 | 2. | 1.36 | 4.2 | 5.34 | 2.15 | 2.38 | 2.5 | 2.5 | 50. | 44.89 | .13 | .14 | 5. | 5. |
| 13-Jan-94 | M03A0201 | 8.17 | 7.9 | 4. | 1.58 | 7.9 | 4.74 | 2.8 | 2.46 | 2.5 | 2.5 | 50. | 50. | .13 | .13 | 5. | 5. |
| 17-Jan-94 | M03A0203 | 7.79 | 7.92 | 1.05 | 1.47 | 9. | 4.08 | 2.7 | 2.52 | 2.5 | 2.5 | 8. | 45.33 | .13 | .13 | 5. | 5. |
| 20-Jan-94 | M03A0202 | 7.75 | 7.88 | 1. | 1.46 | 6.1 | 4.6 | 2.7 | 2.58 | 2.5 | 2.5 | 8. | 40.67 | .13 | .13 | 5. | 5. |
| 24-Jan-94 | M03A0204 | 7.6 | 7.86 | 2. | 1.57 | 12. | 5.73 | 2.7 | 2.55 | 2.5 | 2.5 | 19. | 37.22 | .13 | .13 | 5. | 5. |
| 27-Jan-94 | M03A0205 | 7.5 | 7.84 | 1. | 1.57 | 11. | 6.21 | 2.7 | 2.61 | 2.5 | 2.5 | 16. | 33.44 | .13 | .13 | 5. | 5. |
| 31-Jan-94 | M03A0206 | 8.02 | 7.85 | 2.1 | 1.68 | 6.2 | 6.84 | 2.8 | 2.67 | 2.5 | 2.5 | 50. | 33.44 | .13 | .13 | 5. | 5. |
| 3-Feb-94 | M03A0207 | 7.6 | 7.82 | 1. | 1.68 | 3.8 | 6.74 | 2.8 | 2.67 | 2.5 | 2.5 | 26. | 30.78 | .13 | .13 | 5. | 5. |
| 7-Feb-94 | M03A0208 | 7.57 | 7.8 | 1.1 | 1.69 | 12. | 8.02 | 2.15 | 2.61 | 2.5 | 2.5 | 19. | 27.33 | .13 | .13 | 5. | 5. |
| 10-Feb-94 | M03A0209 | 7.98 | 7.78 | 2. | 1.69 | 9.7 | 8.63 | 2.8 | 2.68 | 2.5 | 2.5 | 45. | 26.78 | .13 | .13 | 5. | 5. |
| 14-Feb-94 | M03A0210 | 8.04 | 7.76 | 1. | 1.36 | 3.8 | 8.18 | 2.8 | 2.68 | 2.5 | 2.5 | 37. | 25.33 | .13 | .13 | 5. | 5. |
| 17-Feb-94 | M03A0211 | 7.87 | 7.77 | 2. | 1.47 | 4.2 | 7.64 | 2.15 | 2.62 | 2.5 | 2.5 | 15. | 26.11 | .13 | .13 | 5. | 5. |
| 21-Feb-94 | M03A0212 | 7.53 | 7.75 | 1. | 1.47 | 8.6 | 7.92 | 2.15 | 2.56 | 2.5 | 2.5 | 21. | 27.56 | .13 | .13 | 5. | 5 |
| 24-Feb-94 | M03A0213 | 8.14 | 7.81 | 2.2 | 1.49 | 4. | 7.03 | 2.8 | 2.57 | 2.5 | 2.5 | 19. | 27.56 | .13 | .13 | 5. | 5. |
| 28-Feb-94 | M03A0214 | 7.94 | 7.85 | 1. | 1.49 | 4.8 | 6.34 | 2.8 | 2.58 | 2.5 | 2.5 | 19. | 27.89 | .13 | .13 | 5. | 5. |
| 3-Mar-94 | M03A0215 | 7.62 | 7.81 | 1. | 1.37 | 8.1 | 6.56 | 2.8 | 2.58 | 2.5 | 2.5 | 50. | 27.89 | .13 | .13 | 5. | 5. |
| 7-Mar-94 | M03A0216 | 7.78 | 7.83 | 1. | 1.37 | 10. | 7.24 | 2.15 | 2.51 | 2.5 | 2.5 | 105. | 36.67 | .13 | .13 | 5. | 5. |
| 10-Mar-94 | M03A0217 | 7.73 | 7.85 | 2. | 1.47 | 17. | 7.8 | 2.7 | 2.57 | 2.5 | 2.5 | 122. | 48.11 | .13 | .13 | 5. | 5. |
| 14-Mar-94 | M03A0218 | 7.87 | 7.84 | 2. | 1.47 | 3.3 | 7.09 | 2.8 | 2.57 | 2.5 | 2.5 | 26. | 46. | .13 | .13 | 5. | 5 |
| 17-Mar-94 | M03A0219 | 7.75 | 7.8 | 1. | 1.47 | .5 | 6.72 | 2.8 | 2.57 | 2.5 | 2.5 | 14. | 43.44 | .13 | .13 | 5. | 5. |
| 21-Mar-94 | M03A0220 | 7.87 | 7.8 | 4.2 | 1.71 | 18 | 8.26 | 2.8 | 2.64 | 2.5 | 2.5 | 243. | 68.78 | .13 | .13 | 5 | 5. |
| 24-Mar-94 | M03A0221 | 7.52 | 7.8 | 2. | 1.82 | 20.2 | 9.54 | 2.95 | 2.73 | 2.5 | 2.5 | 78. | 75.11 | .13 | .13 | 5. | 5. |
| 28-Mar-94 | M03A0222 | 8. | 7.79 | 1. | 1.69 | 10. | 10.21 | 2.8 | 2.73 | 2.5 | 2.5 | 98. | 83.89 | .13 | .13 | 5. | 5. |
| 31-Mar-94 | M03A0223 | 7.93 | 7.79 | | | | | | | | | | | | | | |

## TABLE 5-2 (Continued)
### Treated Water Results Summary

| | | As | | Ba | | Cd | | Cr | | Cu | | Pb | | Mn | | Hg | | Ni | | Se | | Ag | | Zn | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Collected | Set No. | 150 PPB | | 200 PPB | | 50 PPB | | 500 PPB | | 15 PPB | | 66 PPB | | 300 PPB | | 1 PPB | | 148 PPB | | 20 PPB | | 5 PPB | | 162 PPB | |
| | | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | -Av | Daily | -Av | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | R-Avg | Daily | R-Av | Daily | R-Avg |
| 2-Dec-93 | M03A0189 | 13.4 | | 8.3 | | 2. | | 3. | | 4.7 | | 17. | | 9.3 | | .1 | | 7.5 | | 1.5 | | 2. | | 25. | |
| 6-Dec-93 | M03A0190 | 11.9 | | 18. | | 2. | | 3. | | 2. | | 17. | | 24.4 | | .1 | | 7.5 | | 1.5 | | 2. | | 16. | |
| 9-Dec-93 | M03A0191 | 9.6 | | 17.6 | | 2. | | 3. | | 2. | | 17. | | 19.3 | | .1. | | 7.5 | | 1.5 | | 2. | | 12.4 | |
| 13-Dec-93 | M03A0192 | 7.6 | | 15. | | 2. | | 3. | | 2. | | 17. | | 19. | | .1 | | 7.5 | | 1.5 | | 2. | | 7.6 | |
| 16-Dec-93 | M03A0193 | 14.2 | | 20.5 | | 2. | | 3. | | 2. | | 17. | | 22.7 | | .1 | | 7.5 | | 1.5 | | 2. | | 12. | |
| 20 Dec-93 | M03A0194 | 14. | | 5.7 | | 2. | | 3. | | 2. | | 17. | | 4.5 | | .1 | | 7.5 | | 1.5 | | 2. | | 17.8 | |
| 23-Dec-93 | M03A0195 | 11.1 | | 14. | | 2. | | 3. | | 2. | | 17. | | 12.6 | | .1 | | 7.5 | | 3.5 | | 2. | | 19.9 | |
| 27-Dec 93 | M03A0196 | 12.8 | | 19.3 | | 2. | | 3. | | 2. | | 17. | | 15.3 | | .1 | | 7.5 | | 3.2 | | 2. | | 22.5 | |
| 31-Dec-93 | M03A0197 | 20.7 | 12.8 | 22.3 | 15.6 | 2. | 2. | 3. | 3. | 2. | 2.3 | 17. | 17. | 17.1 | 16. | .1 | .1 | 7.5 | 7.5 | 3.5 | 2.1 | 2. | 2. | 13.6 | 16.3 |
| 3-Jan 94 | M03A0198 | 9.7 | 12.4 | 18.7 | 16.8 | 2. | 2. | 3. | 3 | 2. | 2. | 17. | 17. | 17.5 | 16.9 | .1 | .1 | 7.5 | 7.5 | 1.5 | 2.1 | 2. | 2. | 13.5 | 15. |
| 6 Jan-94 | M03A0199 | 17.3 | 13. | 17. | 16.7 | 2. | 2 | 3. | 3. | 2. | 2. | 17. | 17. | 21.3 | 16.6 | .1 | .1 | 7.5 | 7.5 | 1.5 | 2.1 | 2. | 2. | 17.6 | 15.2 |
| 10-Jan-94 | M03A0200 | 15.9 | 13.7 | 13.3 | 16.2 | 2. | 2. | 3. | 3. | 2. | 2. | 17. | 17. | 13.8 | 16. | .1 | .1 | 7.5 | 7.5 | 1.5 | 2.1 | 2. | 2. | 23. | 16.4 |
| 13-Jan 94 | M03A0201 | 10.8 | 14.1 | 8.8 | 15.5 | 2.5 | 2.1 | 2 | 2.9 | 2.5 | 2.1 | 21. | 17.4 | 12.3 | 15.2 | .1 | .1 | 9.5 | 7.7 | 3.4 | 2.3 | 2. | 2. | 27.9 | 18.6 |
| 17 Jan 94 | M03A0203 | 7.4 | 13.3 | 15.3 | 14.9 | 2.5 | 2.1 | 2. | 2.8 | 2.5 | 2.1 | 21. | 17.9 | 15.2 | 14.4 | .1 | .1 | 9.5 | 7.9 | 1.5 | 2.3 | 2. | 2. | 21.2 | 19.7 |
| 20-Jan 94 | M03A0202 | 10.9 | 13. | 12.1 | 15.6 | 2.5 | 2.2 | 2. | 2.7 | 2.5 | 2.2 | 21. | 18.3 | 14.8 | 15.5 | .1 | .1 | 9.5 | 8.2 | 1.5 | 2.3 | 2. | 2. | 15.6 | 19.4 |
| 24-Jan-94 | M03A0204 | 10. | 12.8 | 13.2 | 15.6 | 2.5 | 2.2 | 2. | 2.6 | 2.5 | 2.2 | 21. | 18.8 | 22.9 | 16.7 | .1 | .1 | 9.5 | 8.4 | 1.5 | 2.1 | 2. | 2. | 24.4 | 19.9 |
| 27-Jan 94 | M03A0205 | 11.2 | 12.7 | 10. | 14.5 | 2.5 | 2.3 | 3.5 | 2.6 | 2.5 | 2.3 | 21. | 19.2 | 24. | 17.7 | .1 | .1 | 9.5 | 8.6 | 1.5 | 1.9 | 2. | 2. | 30. | 20.8 |
| 31 Jan 94 | M03A0206 | 17.6 | 12.3 | 12. | 13.4 | 2.5 | 2.3 | 3.5 | 2.7 | 2.5 | 2.3 | 21. | 19.7 | 17. | 17.6 | .1 | .1 | 9.5 | 8.8 | 1.5 | 1.7 | 2. | 2. | 32. | 22.8 |
| 3-Feb-94 | M03A0207 | 11.8 | 12.5 | 16.4 | 13.1 | 2.5 | 2.4 | 3.5 | 2.7 | 2.5 | 2.4 | 21. | 20.1 | 22.5 | 18.2 | .1 | .1 | 9.5 | 9.1 | .5 | 1.6 | 2. | 2. | 28.2 | 24.4 |
| 7-Feb-94 | M03A0208 | 9.9 | 11.7 | 17.1 | 13.1 | 2.5 | 2.4 | 2. | 2.6 | 2.5 | 2.4 | 21. | 20.6 | 25.7 | 18.7 | .1 | .1 | 9.5 | 9.3 | 1.5 | 1.6 | 1.5 | 1.9 | 19. | 24.6 |
| 10 Feb-94 | M03A0209 | 9.3 | 11. | 11.6 | 12.9 | 2.5 | 2.5 | 2. | 2.5 | 2.5 | 2.5 | 21. | 21. | 11.6 | 18.4 | .1 | .1 | 9.5 | 9.5 | 1.5 | 1.6 | 1.5 | 1.9 | 18.4 | 24.1 |
| 14-Feb 94 | M03A0210 | 8.7 | 10.8 | 9.8 | 13.1 | 2.5 | 2.5 | 2. | 2.5 | 2.5 | 2.5 | 21. | 21. | 9.1 | 18.1 | .1 | .1 | 9.5 | 9.5 | 1.5 | 1.4 | 1.5 | 1.8 | 12.8 | 22.4 |
| 17-Feb-94 | M03A0211 | 13.4 | 11.4 | 10.1 | 12.5 | 2.5 | 2.5 | 2. | 2.5 | 2.5 | 2.5 | 21. | 21. | 24.1 | 19.1 | .1 | .1 | 9.5 | 9.5 | 1.5 | 1.4 | 1.5 | 1.8 | 11.2 | 21.3 |
| 21-Feb-94 | M03A0212 | 11.1 | 11.4 | 19.4 | 13.3 | 2.5 | 2.5 | 2. | 2.5 | 2.5 | 2.5 | 21. | 21. | 24.6 | 20.2 | .1 | .1 | 22. | 10.9 | 1.5 | 1.4 | 1.5 | 1.7 | 24.8 | 22.3 |
| 24-Feb-94 | M03A0213 | 12.1 | 11.7 | 8.8 | 12.8 | 2.5 | 2.5 | 2. | 2.5 | 2.5 | 2.5 | 21. | 21. | 5. | 18.2 | .1 | .1 | 9.5 | 10.9 | 1.5 | 1.4 | 1.5 | 1.7 | 20.2 | 21.8 |
| 28-Feb 94 | M03A0214 | 8.8 | 11.4 | 10.8 | 12.9 | 2.5 | 2.5 | 2. | 2.3 | 2.5 | 2.5 | 21. | 21. | 12.2 | 16.9 | .1 | .1 | 9.5 | 10.9 | .5 | 1.3 | 1.5 | 1.6 | 18.8 | 20.6 |
| 3-Mar-94 | M03A0215 | 8.4 | 10.4 | 20.6 | 13.8 | 2.5 | 2.5 | 2. | 2.2 | 2. | 2.4 | 21. | 21. | 27.5 | 18. | .1 | .1 | 9.5 | 10.9 | .5 | 1.2 | 1.5 | 1.6 | 14.4 | 18.6 |
| 7-Mar 94 | M03A0216 | 10. | 10.2 | 21.7 | 14.4 | 2.5 | 2.5 | 2. | 2. | 2.5 | 2.4 | 21. | 21. | 20.8 | 17.8 | .1 | .1 | 9.5 | 10.9 | .5 | 1.2 | 1.5 | 1.5 | 20.3 | 17.8 |
| 10 Mar-94 | M03A0217 | 8.2 | 10. | 25.6 | 15.4 | 2.5 | 2.5 | 2. | 2. | 2.5 | 2.4 | 20.5 | 20.9 | 20.8 | 17.3 | .1 | .1 | 9.5 | 10.9 | .5 | 1.1 | 1.5 | 1.5 | 10.4 | 16.8 |
| 14-Mar-94 | M03A0218 | 7.1 | 9.8 | 30.3 | 17.5 | 2.5 | 2.5 | 2. | 2. | 2.5 | 2.4 | 20.5 | 20.9 | 8.4 | 16.9 | .1 | .1 | 9.5 | 10.9 | .5 | .9 | 1.5 | 1.5 | 17.9 | 16.8 |
| 17-Mar-94 | M03A0219 | 9.4 | 9.8 | 39. | 20.7 | 2.5 | 2.5 | 2. | 2. | 2.5 | 2.4 | 20.5 | 20.8 | 7.3 | 16.7 | .1 | .1 | 9.5 | 10.9 | .5 | .8 | 1.5 | 1.5 | 13.3 | 16.8 |
| 21-Mar-94 | M03A0220 | 12.2 | 9.7 | 31. | 23. | 2.5 | 2.5 | 2. | 2. | 2.5 | 2.4 | 20.5 | 20.8 | 32.3 | 17.7 | .1 | .1 | 9.5 | 10.9 | 1. | .8 | 1.5 | 1.5 | 17.6 | 17.5 |
| 24 Mar-94 | M03A0221 | 12.8 | 9.9 | 19.6 | 23. | 2.5 | 2.5 | 2. | 2. | 2.5 | 2.4 | 20.5 | 20.7 | 27.4 | 18. | .1 | .1 | 9.5 | 9.5 | 1.5 | .8 | 1.5 | 1.5 | 21.9 | 17.2 |
| 28-Mar-94 | M03A0222 | 19.7 | 10.7 | 24. | 24.7 | 2.5 | 2.5 | 2. | 2 | 2.5 | 2.4 | 20.5 | 20.7 | 27. | 20.4 | .1 | .1 | 9.5 | 9.5 | 1.5 | .8 | 1.5 | 1.5 | 11 | 16.2 |
| 31-Mar-94 | M03A0223 | | | | | | | | | | | | | | | | | | | | | | | | |

## ATTACHMENT 5A

**Rochem Environmental, Inc. - Progress Report**

ROCHEM
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April 1, 1994

Mr. Mark Collins
French Limited Project
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Dear Mark:

We are submitting our report for the month March.

During the month, we treated 3,119,700 gallons of water. On contract we have 23,026,000 gallons to date.

All continues to go well. Pond water temperatures are still depressed resulting in lower permeate flow rates. We expect this to begin to improve in the upcoming months.

Sincerely,

Kenneth A. Miller
President

/plz

# 6.0 AMBIENT AIR MANAGEMENT

Ambient air quality management continued on an "as-needed" basis to protect the environment and human health.

## 6.1 Summary of Activities

Collected and analyzed three time-integrated personnel exposure samples; the measured levels of volatile organic compounds were well below the action levels.

Sampled the ambient air in all work areas several times per shift and on a random "spot-check" basis; there were no levels of volatile organic compounds which required response action.

## 6.2 Problems and Response Action

| Response | Solution |
|---|---|
| Calibrate portable vapor meters. | Train operators to calibrate; refurbish all meters. |
| Sampling "hot" wells. | Require respirator use when sampling "hot" wells. |
| Ambient air quality in all work areas. | Check all work areas with portable meter several times per day. |

## 6.3 Problems Resolved

None.

### 6.4 On-going Events/Activities

Measure ambient air quality in all work areas several times per day.

Conduct time-integrated sampling in all major work areas.

Require respiratory protection when sampling "hot" wells.

Conduct necessary air sampling and analyses to issue "burn" permits.

Closely monitor ambient air quality in the vicinity of new projects/activities.

Conduct respirator fit tests on all employees.

# 7.0 QUALITY ASSURANCE/QUALITY CONTROL

## 7.1 Summary of Activities

### 7.1.1 Sampling

One set of personal air monitoring samples was collected in March. The following is a summary of current routine and special air matrix code sample specifics:

| MATRIX CODE | SAMPLE SPECIFICS |
|---|---|
| M01D | TF at three locations |

TF = Tenax® front tube

Table 7-1 is a summary of the air, soil and water samples collected for the month of March:

**TABLE 7-1**

**Monthly Sampling Summary**

| Matrix Description/ (Code) | Tubes Analyzed | Analysis Parameters | QC Level |
|---|---|---|---|
| **AIR SAMPLING:** | | | |
| Personal Air (M01D) | 3 | TO-1 | II |

## TABLE 7-1 (Continued)

### Monthly Sampling Summary

| Matrix Description/ (Code) | Samples | Analysis Parameters | QC Level |
|---|---|---|---|
| **PROCESS AND TREATED WATER:** | | | |
| Treated Water (M03A) | 8 | GFAA-TW, HG, ICP-TW,OILS, PCB, SV$TCL, TOC, TSS | II |
| Process Water (M06C) | 5 | K, NUTRIENTS,TDS,TOC,TOC-FLTG, TOX,VOA$TCL | I |
| Process Water (S16F) | 16 | TSS, VSS, TS | NONE |
| Potable Water (M08A), | 1 | CL,COLOR,CORROS, DW-GFAA,DW-ICP,FL,HERB, HG, NO3N,ODOR,PEST-TCL, SO4, SURFACTANT, SV$TCL, TDS, VOA$TCL | II |
| **WELLS:** | | | |
| Well Nutrients | 20 | K, NO3N | I |
| Sikes Perimeter (S14H) [S1-116,S1-117, INT-116,INT-117, S1-118] | 5 | VOA$TCL | I |
| Bounceback/Pulse Pump (S14L) [S1-33,S1-34, S1-36,S1-37,S1-23, S1-42,S1-38] | 7 | VOA$TCL | I |
| 1st Qtr 1994 Monitoring (M04A) | 20 | VOA$TCL, NO3N, OP-P, K | I |

## TABLE 7-1 (Continued)

### Monthly Sampling Summary

| Matrix Description/ (Code) | Samples | Analysis Parameters | QC Level |
|---|---|---|---|
| **SOILS/SLUDGES:** | | | |
| Landfill Tar (S17A) [INT-215SS 1-5'] | 1 | TCL Metals, PCB, SV$TCL, VOA$TCL | II |
| Cell F Liquor (S19D) | 1 | GFAA-TW, HG, ICP-TW, OILS, PCB, SV$TCL, TOC, TSS, VOA$TCL | I |
| **SPECIAL SAMPLES:** | | | |
| Demobilization Rinsate (S17H) | 1 | GFAA-TW, HG, ICP-TW, OILS, PCB, SV$TCL, TOC, TSS, VOA$TCL. | II |
| Wetlands Investigation (S19A, S19C, S19F) | 20 | TCL Metals, PEST/PCB, TOX, TPH, VOA$TCL, NH3N, NO3N, OP-P, K | I |

### 7.1.2 Data Validation Activities Summary

#### 7.1.2.1 Treated Water Samples

Data validation was completed for sample sets M03A0203, M03A0204, M03A0205, M03A0206, M03A0207, and M03A0208, M03A0209, M03A0210, M03A0211 and M03A0212. These samples were collected between January 24, 1993 and February 24, 1994. QC failures are summarized in Table 7-2. Completeness values are summarized in Tables 7-3 through 7-7.

#### 7.1.2.2 Groundwater Samples

Data validation (VSDS processing and QC review) was completed for the 92 wells sampled in December for annual monitoring. QC failures are summarized in Tables 7-8 and 7-9. Completeness values are summarized in Tables 7-13 through 7-16.

#### 7.1.2.3 Lagoon Subsoil Samples

There was no Lagoon Subsoil data processed or QA reviewed this month.

#### 7.1.2.4 Other Samples

No special or spill sample sets have been submitted during this reporting period.

## 7.2 Data Validation QC Summary and Discussion

### 7.2.1 Level I and Level II QC Philosophy

The Quality Assurance Project Plan (QAPP) defines data validity in terms of procedural requirements which must be followed for data comparability, and numerical data quality objectives which must be met to assure precision and accuracy of the results. Precision, accuracy and completeness are the numerical Data Quality Objectives (DQOs) established for the French Project by the QAPP. The intent of the data validation process is to verify that the documentation and quality control data provided by the laboratory properly substantiate the required data quality.

The revised QAPP describes both a manual data validation process using checklists and hardcopy QC reports submitted with sample results, and a computerized data validation procedure utilizing digital sample results and QC reports. The operations phase began with manual data validation, changed to a combination of manual and computerized data validation and has now switched over completely to computerized data reporting/validation.

For purposes of data validation procedures, the QAPP defines two QC levels: Level I and Level II. Level I data validation is specified for process control and progress monitoring sample data validation and Level II data validation is specified for remediation verification sample results.

### 7.2.2 QA Issues

An RFP for analytical services was submitted to four laboratories this month. American Analytical and Technical Services (AATS) was selected from the three laboratories which responded to the RFP. This selection was based on responsiveness to the RFP, competitive analytical prices, ability to generate appropriate electronic deliverables and a visit to the laboratory by Ron Jansen. Analytical services from AATS commenced on April 1,1994. A formal laboratory audit will be conducted in mid April by Don Flory and Ron Jansen.

## TABLE 7-2

### Treated Water
### QC Failure Summary

| Sample Date | Test | QC Failure | Explanation | Corrective Action |
|---|---|---|---|---|
| 01/24/94 | SV | RRT-Calib | Failed peak no. and RRT for calibration | Confirmed mass spectra-doesn't affect data quality |
| 01/24/94 | AS | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| 01/24/94 | AGr | PDL, Blank Clean | Instrument detection levels were higher | Lab instructed to analyze Silver by GFAA in future. |
| 01/27/94 | SV | RRT-Calib | Failed peak no. and RRT for calibration | Confirmed mass spectra-doesn't affect data quality |
| 01/27/94 | AS | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| 01/27/94 | SE | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| 01/27/94 | SE | MS Recov. | Failed matrix spike on group leader; LCS recovery good. | Matrix effect-no corrective action necessary |
| 01/27/94 | AG | PDL, Blank Clean | Instrument detection levels were higher | Lab instructed to analyze Silver by GFAA in future. |
| 01/31/94 | VOA | RRT-Calib | Failed peak no. and RRT for calibration | Confirmed mass spectra-doesn't affect data quality |
| 01/31/94 | AG | PDL, Blank Clean | Instrument detection levels were higher | Lab instructed to analyze Silver by GFAA in future. |
| 02/03/94 | SV | RRT-Calib | Failed peak no. and RRT for calibration | Confirmed mass spectra-doesn't affect data quality |
| 02/03/94 | SV | SU Recov. | Failed SU1 recovery | Re-extract sample |
| 02/03/94 | SV | Extract. HT | Failed Extraction HT on Re-extraction of SU1 failure | Lab warned to prevent this type of failure; invoice rejected |
| 02/03/94 | VOA | SU Recov. | Failed SU1 recovery in MS & MSD sample. | Matrix effect-no corrective action necessary |
| 02/03/94 | SE | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| 02/03/94 | AG | PDL, Blank Clean | Instrument detection levels were higher | Lab instructed to analyze Silver by GFAA in future. |
| 02/07/94 | SV | RRT-Calib | Failed peak no. and RRT for calibration | Confirmed mass spectra-doesn't affect data quality |
| 02/07/94 | SE | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| 02/07/94 | AG | PDL, Blank Clean | Instrument detection levels were higher | Lab instructed to analyze Silver by GFAA in future. |
| 02/07/94 | AS | MS Recov. | Failed matrix spike on group leader; LCS recovery good. | Matrix effect-no corrective action necessary |

## TABLE 7-2 (Continued)

### Treated Water
### QC Failure Summary

| Sample Date | Test | QC Failure | Explanation | Corrective Action |
|---|---|---|---|---|
| 02/10/94 | SV | RRT-Calib | Failed peak no. and RRT for calibration | Confirmed mass spectra-doesn't affect data quality |
| 02/10/94 | VOA | RRT-Calib | Failed peak no. and RRT for calibration | Confirmed mass spectra-doesn't affect data quality |
| 02/14/94 | SV | RRT-Calib | Failed peak no. and RRT for calibration | Confirmed mass spectra-doesn't affect data quality |
| 02/14/94 | VOA | RRT-Calib | Failed peak no. and RRT for calibration | Confirmed mass spectra-doesn't affect data quality |
| 02/14/94 | AS | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| 02/14/94 | SE | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| 02/14/94 | AS | MS Recov. | Failed matrix spike on group leader; LCS recovery good. | Matrix effect-no corrective action necessary |
| 02/17/94 | SV | RRT-Calib | Failed peak no. and RRT for calibration | Confirmed mass spectra-doesn't affect data quality |
| 02/17/94 | AS | FAS Recov. | Failed post digestion spike; MSA used | No corrective action necessary |
| 02/21/94 | SE | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| 02/24/94 | VOA | RRT-Calib | Failed peak no. and RRT for calibration | Confirmed mass spectra-doesn't affect data quality |
| 02/24/94 | SV | RRT-Calib | Failed peak no. and RRT for calibration | Confirmed mass spectra-doesn't affect data quality |
| 02/24/94 | AG | MS Recov. | Failed matrix spike on group leader; LCS recovery good. | Matrix effect-no corrective action necessary |

### 7.2.3 *Completeness Summaries*

Tables 7-3 through 7-7 summarize completeness values for VOA, SVA, PCBs, Metals and miscellaneous parameters on treated water samples.

VOA (Table 7-3)

A total of 10 VOA sample sets have been validated with all samples meeting data quality objectives.

SVA (Table 7-4)

A total of 10 SVA sample sets have been validated for this time period. All categories meet or exceed Project Completeness Goals.

PCBs (Table 7-5)

A total of 10 PCB sample sets have been validated for this time period with all samples, meeting data quality objectives. All categories meet or exceed Project Completeness Goals.

Metals (Table 7-6)

A total of 10 sample sets have been validated for this time period. Project Completeness Goals are met or exceeded in all categories with the exception of those listed in Table 7-6 and summarized in Table 7-2.

Miscellaneous Parameters (Table 7-7)

A total of 10 sample sets have been validated for this time period. Project completeness goals are met or exceeded in all categories.

## TABLE 7-3

**Completeness Summary**
**M03 TREATED WATER**
**Volatile Organics Analyses**

| SAMPLE DATE SET NUMBER | M03A0203 through M03A0212 | PROJECT TO DATE | PROJECT GOAL |
|---|---|---|---|
| Analysis Holding Time | 100 | 100 | 100 |
| 12 Hour Window | 100 | 100 | 100 |
| SU Check | 100 | 92 | 90 |
| SU1 (d4-1,2-DCE) | 100 | 96 | 90 |
| SU2 (d8-Toluene) | 100 | 97 | 90 |
| SU3 (4-BFB) | 100 | 99 | 90 |
| IS Check | 100 | 100 | 90 |
| IS1 (BrClMethane) | 100 | 100 | 90 |
| IS2 (1,4-DiFlBenzene) | 100 | 100 | 90 |
| IS3( d5-ClBenzene) | 100 | 100 | 90 |
| Sample RT/RRT Check | 100 | * | |
| Vinyl Chloride | | | |
| Accuracy | 100 | 99 | 90 |
| Precision | 100 | 99 | 90 |
| Benzene | | | |
| Accuracy | 100 | 99 | 90 |
| Precision | 100 | 100 | 90 |
| No Group Matrix Effect | 90 | * | 90 |
| No Sample Matrix Effect | 100 | * | 90 |
| Tune Check | 100 | * | |
| Overall ICAL Check | 100 | * | |
| Overall CCAL Check | 100 | * | |
| Overall Lab Blank Check | 100 | * | |

* - Level II QC checks were performed on 10% of samples prior to 6/14/93. PTD completeness values do not apply to these checks.

## TABLE 7-4

**Completeness Summary**
**M03A Treated Water**
**Semivolatile Organic Analyses**

| SAMPLE DATE SET NUMBER | M03A0203 through M03A0212 | PROJECT TO DATE | PROJECT GOAL |
|---|---|---|---|
| Extract Holding Time | 90 | 100 | 100 |
| Analysis Holding Time | 100 | 100 | 100 |
| 12 Hour Window | 100 | 100 | 100 |
| **SU Check** | **98** | **94** | **90** |
| SU1 (2-FlPhenol) | 90 | 94 | 90 |
| SU2 (d5-Phenol) | 100 | 92 | 90 |
| SU3 (d5-Nitrobenz) | 100 | 97 | 90 |
| SU4(2-FlBiphenyl) | 100 | 99 | 90 |
| SU5(2,4,6-TBPh) | 100 | 95 | 90 |
| SU6(d14-Terphen) | 100 | 96 | 90 |
| **IS Check** | **100** | **95** | **90** |
| IS1 (d4-1,4-DiClBenz) | 100 | 100 | 90 |
| IS2 (d8-Naph) | 100 | 100 | 90 |
| IS3 ( d10-Acenaph) | 100 | 100 | 90 |
| IS4 (d10-Phenanth) | 100 | 99 | 90 |
| IS5 (d12-Chrysene) | 100 | 97 | 90 |
| IS6 (d12-Perylene) | 100 | 95 | 90 |
| Sample RT/RRT | 100 | * | * |
| Napthalene | | | |
| Accuracy | 100 | 100 | 90 |
| Precision | 100 | 99 | 90 |
| No Group Matrix Effect | 100 | 100 | 90 |
| No Sample Matrix Effect | 100 | 91 | 90 |
| Tune Check | 100 | * | * |
| Overall ICAL Check | 100 | * | * |
| Overall CCAL Check | 100 | * | * |
| Overall Lab Blank Check | 100 | * | * |

* - Level II QC checks were performed on 10% of samples prior to 6/14/93. PTD completeness values do not apply to these checks.

## TABLE 7-5

**Completeness Summary**
**M03A Treated Water**
**PCB Analyses**

| SAMPLE DATE SET NUMBER | M03A0203 through M03A0212 | PROJECT TO DATE | PROJECT GOAL |
|---|---|---|---|
| Extract Holding Time | 100 | 100 | 100 |
| Analysis Holding Time | 100 | 100 | 100 |
| 12 Hour Window | 100 | 100 | 100 |
| SU Check - Column A | 100 | 100 | 90 |
| SU1 (DCBP) | 100 | 81 | NS |
| SU2 (TCMX) | 100 | 97 | NS |
| SU Check - Column B | 100 | 99 | 90 |
| SU1 (DCBP) | 100 | 82 | NS |
| SU2 (TCMX) | 100 | 99 | NS |
| SU Check - Column A or B | 100 | 99 | 90 |
| Aroclor 1242 | | | |
| Accuracy | 100 | 96 | 90 |
| Precision | 100 | 96 | 90 |
| Overall ICAL Check | 100 | * | |
| Overall 1st CCAL Check | 100 | * | |
| Overall 2nd CCAL Check | 100 | * | |
| Overall Lab Blank Check | 100 | * | |

* - Level II QC checks were performed on 10% of samples prior to 6/14/93. PTD completeness values do not apply to these checks.

## TABLE 7-6

### Completeness Summary
### M03A Treated Water
### Metals Analyses

| SAMPLE DATE SET NUMBER | M03A0203 through M03A0212 | PROJECT GOAL |
|---|---|---|
| ANALYTE: BARIUM | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: CADMIUM | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | W | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: CHROMIUM | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | W | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: COPPER | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: LEAD | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |

W - All samples waived due to low response

* Matrix interference is indicated by:
Furnace analyses - failure of analytical spike or low MSA coefficient
ICP analyses - failure of serial dilution

## TABLE 7-6 (Continued)

### Completeness Summary
### M03A Treated Water
### Metals Analyses

| SAMPLE DATE<br>SET NUMBER | M03A0203 through M03A0212 | PROJECT GOAL |
|---|---|---|
| ANALYTE: MANGANESE | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | NA | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: NICKEL | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | W | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: SILVER | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | W | 95 |
| No Matrix Interference* | 90 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: ZINC | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | NA | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: MERCURY | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | W | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |

W - All samples waived due to low response

* Matrix interference is indicated by:
Furnace analyses - failure of analytical spike or low MSA coefficient
ICP analyses - failure of serial dilution

## TABLE 7-6 (Continued)

### Completeness Summary
### M03A Treated Water
### Metals Analyses

| SAMPLE DATE SET NUMBER | M03A0203 through M03A0212 | PROJECT GOAL |
|---|---|---|
| ANALYTE:ARSENIC | | |
| MS Accuracy | 80 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 50 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: SELENIUM | | |
| MS Accuracy | 90 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 50 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |

W - All samples waived due to low response

* Matrix interference is indicated by:
Furnace analyses - failure of analytical spike or low MSA coefficient
ICP analyses - failure of serial dilution

## TABLE 7-7

### Completeness Summary
### M03A Treated Water
### Miscellaneous Parameters Analyses

| SAMPLE DATE SET NUMBER | M03A0203 through M03A0212 | PROJECT TO DATE | PROJECT GOAL |
|---|---|---|---|
| PARAMETER: TOC | | | |
| Analysis Hold Time | 100 | 100 | 100 |
| MS Accuracy | 100 | 100 | NA |
| DUP Precision | 100 | 100 | NA |
| PARAMETER: OILS | | | |
| Analysis Hold Time | 100 | 100 | 100 |
| MS Accuracy | 100 | 100 | NA |
| DUP Precision | 100 | 100 | NA |
| PARAMETER: TSS | | | |
| Analysis Hold Time | 100 | 100 | 100 |
| MS Accuracy | NA | NA | NA |
| DUP Precision | 100 | 100 | NA |

## TABLE 7-8

### Sample Failure Summary
### 1993 Annual Groundwater Monitoring
### Volatile Organics Analyses

| Sample Number | QC Level | QC Failure | Explanation | Corrective Action |
|---|---|---|---|---|
| M04A000801 DL | I | SU Recov. | High recovery of SU2 | None required, data flagged |
| M04B001001 & DL<br>M04B001002 & DL | I | SU Recov. | Low recovery of SU1 | None required, data flagged |
| M04B001202 | II | Analysis HT | Analyzed 4 days past HT | Invoice and data rejected |
| M04A000901 MS<br>M04A000901 MSD | I<br>I | Analysis HT | Analyzed 3 days past HT | Data flagged |
| M04A000903 & DL<br>M04A000904 & DL<br>M04A000905 & DL<br>M04A000906 & DL | I | SU Recov. | SU1 high recovery for both original run and dilution | None required, data flagged |
| M04D0012 (ALL) | I | RRT-Calib. | RRT and peak no. failures on calibration. | Confirm mass spectra-doesn't affect data quality |
| M04D0012 (ALL) | I | Blank clean | Acetone exceeded MDL | Typical lab contaminant-doesn't affect data quality |
| M04D001303 & DL<br>M04D001304 & DL<br>M04D001305 & DL<br>M04D001306 & DL | I | SU Recov. | SU1 High recovery for both original run and dilution | None required, data flagged |
| M04F000801 MS | I | MS Accur. | Vinyl Chloride spike high recovery RPD of spike and dup OK | None required |

## TABLE 7-9

### Sample Failure Summary
### 1993 Annual Groundwater Monitoring
### Semivolatile Organics Analyses

| Sample Number | QC Level | QC Failure | Explanation | Corrective Action |
|---|---|---|---|---|
| M04C0010 (ALL) | I | SU Recov. | All surrogates were diluted out | Data flagged |
| M04C0010 (ALL) | I | RRT-Calib. | RRT and peak no. failures on calibration. | Confirmed mass spectra - doesn't affect data quailty |
| M04C0011 (ALL) | I | RRT-Calib. | RRT and peak no. failures on calibration. | Confirmed mass spectra - doesn't affect data quailty |
| M04C0012 (ALL) | I | RRT-Calib. | RRT and peak no. failures on calibration. | Confirmed mass spectra - doesn't affect data quailty |
| M04F0006 (ALL) | I | Analysis HT | Holding times exceeded by fraction of a day | Reject data and invoice -lab warned against reoccurrence |
| M04F000601 & MS/MSD | I | SU Recov. | SU6 low recovery on group leader | Matrix effect-none required |
| M04F0006 MS/MSD | I | MS Accur. | low reovery of B(a)P and naphthalene spike | Matrix effect-none required |
| M04F0007 (ALL) | I | Blank clean | Bis-2-ethyl-hexyl phthalate in extraction blank | Common lab contaminant-doesn't affect data quality |
| M04F0007 (ALL) | I | RRT-sample. | RRT and peak no. failures on blank. | Confirmed mass spectra - doesn't affect data quailty |
| M04F000803 | I | SU Recov. | SU3 & SU6 low recovery | Data flagged |
| M04F000806 | I | SU Recov. | SU5 high recovery | Data flagged |
| M04F000801 MS | I | SU Recov. | SU5 high recovery | Data flagged |
| M04F0008 (ALL) | I | RRT-Calib. | RRT and peak no. failures on calibration. | Confirmed mass spectra - doesn't affect data quailty |

## TABLE 7-10

### Sample Failure Summary
### 1993 Annual Groundwater Monitoring
### Pesticide/PCB Analyses

| Sample Number | QC Level | QC Failure | Explanation | Corrective Action |
|---|---|---|---|---|
| M04F0006 (ALL) | I | SU Recov. | DCBP low on all samples, TCMX OK | Data flagged |
| M04F000701<br>M04F000701 MS/MSD<br>M04F0000702<br>M04F0000705<br>M04F000707 | I | SU Recov. | DCBP low on all samples, TCMX OK | Data flagged |
| M04F000803<br>M04F000804<br>M04F000805<br>M04F000806 | I | SU Recov. | DCBP low on all samples, TCMX OK | Data flagged |

## TABLE 7-11

### Sample Failure Summary
### 1993 Annual Groundwater Monitoring
### Metals Analyses

| Sample Number | QC Level | QC Failure | Explanation | Corrective Action |
|---|---|---|---|---|
| **Arsenic** | | | | |
| M04F000603 | I | FAS Recov. | Failed post digestion spike; MSA used | None required |
| M04F000802 | I | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| M04F000803 | I | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| **Selenium** | | | | |
| M04F000601 | I | FAS Recov. | Failed post digestion spike; MSA used | None required |
| M04F000802 | I | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| M04F000804 | I | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| M04F000805 | I | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| **Thallium** | | | | |
| M04F000601 | I | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| M04F000602 | I | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| **Nickel** | | | | |
| M04F000802 | I | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| M04F000806 | I | FAS Recov. | Failed post digestion spike; MSA not used due to low absorbance | Matrix effect-no corrective action necessary |
| **Zinc** | | | | |
| M04F0008 (ALL) | I | MS Recov. | Failed matrix spike on group leader; LCS recovery good. | Matrix effect-no corrective action necessary. |

*All sets QC Level I.

## TABLE 7-12

### Sample Failure Summary
### 1993 Annual Groundwater Monitoring
### Miscellaneous Parameters Analyses

| Sample Number | QC Level | QC Failure | Explanation | Corrective Action |
|---|---|---|---|---|
| **TOX** | | | | |
| M04A0008 (ALL) | I | Analysis HT | 6 days past HT | reject invoice |
| M04A0009 (ALL) | I | Analysis HT | 13 days past HT | reject invoice |
| M04B0010 (ALL) | I | Analysis HT | 6 days past HT | reject invoice |
| M04B0011 (ALL) | I | Analysis HT | 13 days past HT | reject invoice |
| M04B0012 (ALL) | I | Analysis HT | 18 days past HT | reject invoice |
| M04C0010 (ALL) | I | Analysis HT | 5 days past HT | reject invoice |
| M04C0011 (ALL) | I | Analysis HT | 15 days past HT | reject invoice |
| M04D0009 (ALL) | I | Analysis HT | 15 days past HT | reject invoice |
| M04D0010 (ALL) | I | Analysis HT | 15 days past HT | reject invoice |
| M04D0011 (ALL) | I | Analysis HT | 15 days past HT | reject invoice |
| M04D0012 (ALL) | I | Analysis HT | 9 days past HT | reject invoice |
| M04E0006 (ALL) | I | Analysis HT | 9 days past HT | reject invoice |
| M04F0006 (ALL) | I | Analysis HT | 16 days past HT | reject invoice |
| M04F0007 (ALL) | I | Analysis HT | 12 days past HT | reject invoice |
| M04F0008 (ALL) | I | Analysis HT | 11 days past HT | reject invoice |
| **TOC-FLTG** | | | | |
| M04B0011-01 | I | Dup Prec | high RPD | data flagged |
| **TDS** | | | | |
| M04B0011-01 | I | Dup Prec | high RPD | data flagged |
| M04C0011 (ALL) | I | Analysis HT | 1 day past HT | reject invoice |
| M04D0010 (ALL) | I | Analysis HT | 1 day past HT | reject invoice |
| M04F0007 (ALL) | I | Analysis HT | 2 days past HT | reject invoice |
| **IC** | | | | |
| M04B0012-01 | I | MS Accuracy | recovery low | data flagged |
| **OP-P** | | | | |
| M04D0012 | I | Analysis HT | 1 day past HT | reject invoice |
| **NO3N** | | | | |
| M04D0011 (ALL) | I | Analysis HT | 8 day past HT | reject invoice |
| M04E0006 (ALL) | I | Analysis HT | 14 day past HT | reject invoice |
| M04F0006 (ALL) | I | Analysis HT | 13 day past HT | reject invoice |
| M04F0007 (ALL) | I | Analysis HT | 18 day past HT | reject invoice |

*All sets QC Level I.

## TABLE 7-13

### 1993 Annual Groundwater Completeness Summary Volatile Organics Analysis

| | NUMBER OF SAMPLES | % COMPLETE | PROJECT GOAL |
|---|---|---|---|
| **QC TEST** | | | |
| IS1 (BrClMethane) | 85 | 100 | 90 |
| IS2 (1,4-DiFlBenzene) | 85 | 100 | 90 |
| IS3 (d5-C1Benzene) | 85 | 100 | 90 |
| **IS TEST** | **85** | **100** | **90** |
| SU1 (d4-1,2-DCE) | 76 | 89* | 90 |
| SU2 (d8-Toluene) | 84 | 99 | 90 |
| SU3 (4-BFB) | 85 | 100 | 90 |
| **SU TEST** | **82** | **96** | **90** |
| **MS/MSD PRECISION AND ACCURACY** | | | |
| Vinyl Chloride | | | |
| %REC | 15 | 94 | 90 |
| RPD | 16 | 100 | 90 |
| Benzene | | | |
| %REC | 16 | 100 | 90 |
| RPD | 16 | 100 | 90 |
| **IS/SU CORR. ACTION** | | | |
| Sample Complete | 85 | 99 | 90 |
| Group Leader Complete | 16 | 100 | 90 |
| No Group Matrix Effect | 15 | 94 | 90 |

* Below project goal

## TABLE 7-14

### 1993 Annual Groundwater Completeness Summary Semivolatile Organics Analysis

| QC TEST | NUMBER OF SAMPLES | % COMPLETE | PROJECT GOAL |
|---|---|---|---|
| IS1 (d4-1,4-DiClBenz) | 26 | 100 | 90 |
| IS2 (d8-Naph) | 26 | 100 | 90 |
| IS3 (d10-Acenaph) | 26 | 100 | 90 |
| IS4 (d10-Phenaph) | 26 | 100 | 90 |
| IS5 (d12-Chrysene) | 26 | 100 | 90 |
| IS6-(d12-Perylene) | 26 | 100 | 90 |
| **IS TEST** | **100** | **100** | **90** |
| SU1 (2-FlPhenol) | 21 | 81 | 90 |
| SU2 (d5-Phenol) | 21 | 81 | 90 |
| SU4 (2-FlBiphenyl) | 21 | 81 | 90 |
| **SU ACID TEST** | **21** | **81** | **90** |
| SU3 (d5-Nitrobenz) | 20 | 77* | 90 |
| SU5 (2,4,6-TBPh) | 20 | 77* | 90 |
| SU6 (d14-Terphen) | 20 | 77* | 90 |
| **SU B/N TEST** | **20** | **77*** | **90** |
| **SU TEST** | **20** | **79*** | **90** |
| **MS/MSD PRECISION AND ACCURACY** | | | |
| Napthalene %REC | 6 | 84* | 90 |
| RPD | 3 | 100 | 90 |
| Benzo(a)pyrene %REC | 6 | 84* | 90 |
| RPD | 3 | 100 | 90 |
| **IS/SU CORR. ACTION** | | | |
| Sample Complete | 23 | 89* | 90 |
| Group Leader Complete | 5 | 89* | 90 |
| No Group Matrix Effect | 5 | 89* | 90 |

* Below project goal

## TABLE 7-15

### 1993 Annual Groundwater Completeness Summary PCB Analysis

| QC TEST | NUMBER OF SAMPLES | % COMPLETE | PROJECT GOAL |
|---|---|---|---|
| COLUMN A | | | |
| SU1 (DCBP) | 7 | 44* | NS |
| SU2 (TCMX) | 16 | 100 | NS |
| SU TEST | 23 | 72* | 90 |
| COLUMN B | | | |
| SU1 (DCBP) | 7 | 44* | NS |
| SU2 (TCMX) | 16 | 100 | NS |
| SU TEST | 23 | 72* | 90 |
| **COLUMN A & B SU TEST** | **46** | **72*** | **90** |
| AROCLOR 1242 | | | |
| % REC | 3 | 100 | |
| RPD | 3 | 100 | |

* Below project goal
NS - Not Specified

## TABLE 7-16

### 1993 Annual Groundwater Completeness Summary Metals Analysis

| SAMPLE DATE SET NUMBER | % COMPLETE | PROJECT GOAL |
|---|---|---|
| ANALYTE: **ANTIMONY** | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: **ARSENIC** | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 87 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: **CADMIUM** | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: **CHROMIUM** | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: **COPPER** | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |

* Below project goal

## TABLE 7-16 (Continued)

### 1993 Annual Groundwater Completeness Summary Metals Analysis

| SAMPLE DATE SET NUMBER | % COMPLETE | PROJECT GOAL |
|---|---|---|
| ANALYTE: **LEAD** | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: **MERCURY** | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 87 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: **NICKEL** | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 87 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: **SELENIUM** | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 81 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: **SILVER** | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 100 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |

* Below project goal

## TABLE 7-16 (Continued)

### 1993 Annual Groundwater Completeness Summary Metals Analysis

| SAMPLE DATE SET NUMBER | % COMPLETE | PROJECT GOAL |
|---|---|---|
| ANALYTE: **THALLIUM** | | |
| MS Accuracy | 100 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 87 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |
| ANALYTE: **ZINC** | | |
| MS Accuracy | 94 | 95 |
| DUP Precision/Difference | 100 | 95 |
| No Matrix Interference* | 94 | NA |
| Prep Blank Check | 100 | 100 |
| Lab Control Spike Check | 100 | 100 |

* Below project goal

# 8.0 SITE MAINTENANCE

## 8.1 Summary of Activities

### 8.1.1 General Housekeeping

The site safety and housekeeping inspections and responses kept grounds safe and attractive for employees and visitors. The entire project was inspected twice per week, with written inspection reports issued and appropriate corrective action taken.

### 8.1.2 Purchasing

All purchases were covered by written requisitions and purchase orders. Purchase of chemicals is now reduced to groundwater treatment and insitu remediation. Purchase of lime for Cell E stabilization continued through the month of March with 648 tons purchased through March 31.

### 8.1.3 Equipment Maintenance

Routine preventive and production maintenance was performed on all equipment. There were no emergency maintenance jobs.

## 8.2 Visitors

The following visitors were recorded at the site during March:

| | |
|---|---|
| March 15: | Brian Hillman, Lyondell |
| | Kerry Galvin, Lyondell |
| | Art Sybel, Lyondell |
| | Bob Rector, AHA |
| | (b) (6) local resident |
| March 16: | Joe Credeur, SPL |

March 28: (b) (6) University of Houston, Law

March 30:
Ricky McDowell, LCEC
Vance Elliott, CHCC
(b) (6) CISD
(b) (6) CISD
Steve Campbell, Houston Chronicle
Thomas Manno, LCEC

March 31:
Alonzo Arredondo, TNRCC
Steve Chong, TNRCC
Robert Hinojosa, TNRCC
Eldridge R. Collins, III, TNRCC
Greg Brewer, AATS
K.M.B. Doss, AATS
Randy Creighten, AATS

## 8.3 Emergency Equipment

### 8.3.1 Flood Gate Test

The exclusion wall gate was closed on March 9, 1994 with a good seal noted and recorded.

### 8.3.2 P-8 Auxiliary Pump

P-8 Auxiliary Pump was exercised on March 7, 1994.

### 8.3.3 Fire Extinguishers

All fire extinguishers were inspected and certified.

## 8.4 Security

Smith Security provides 24-hour security at the FLTG site, including the south side of Gulf Pump Road; all site areas are checked hourly. There were no security incidents recorded in March.

## 8.5 Operator Training

All training is documented and records are maintained on site.

## 8.6 Data Management

Data base programming is fully operational. Data is entered on a daily basis.

## 8.7 Personnel Monitoring

Results of personnel monitoring conducted during March are included in Table 8-1.

### 8.8 OVM System

The Ambient Air System, Tenax® A and C included, were taken out of service in December. The meteorological station remains operational.

### 8.9 Repository

Records from the March review are listed in Attachment 8A.

## TABLE 8-1

### On-Site Employee Contaminant Limits
### (From OSHA 29 CFR 1910 Subpart Z)

| Compound | PEL 8 hour PPM | M01D0038 10-Mar-94 Inside Wall | | M01D0038 10-Mar-94 Outside Wall | | M01D0038 10-Mar-94 Demob. Oper. | |
|---|---|---|---|---|---|---|---|
| | | % of PEL | PPM | % of PEL | PPM | % of PEL | PPM |
| Chloromethane | 50 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bromomethane | 5 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Vinyl chloride | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Chloroethane | 1000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Dichloromethane | 50 | 0.000 | 0.000 | 0.002 | 0.001 | 0.004 | 0.002 |
| Acetone | 750 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Carbon disulfide | 10 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1,1-Dichloroethene | 5 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1,1-Dichloroethane | 100 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| trans-1,2-Dichloroethene | 200 | 0.000 | 0.000 | 0.001 | 0.002 | 0.000 | 0.000 |
| Chloroform | 10 | 0.011 | 0.001 | 0.224 | 0.022 | 0.012 | 0.001 |
| 1,2-Dichloroethane | 10 | 0.011 | 0.001 | 0.045 | 0.004 | 0.011 | 0.001 |
| 2-Butanone | 200 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1,1,1-Trichloroethane | 350 | 0.000 | 0.000 | 0.004 | 0.012 | 0.001 | 0.002 |
| Carbon Tetrachloride | 5 | 0.006 | 0.000 | 0.057 | 0.003 | 0.000 | 0.000 |
| Vinyl acetate | 10 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bromodichloromethane | | | 0.000 | | 0.000 | | 0.000 |
| 1,2-Dichloropropane | 75 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| cis-1,3-Dichloropropene | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Trichloroethene | 50 | 0.000 | 0.000 | 0.009 | 0.004 | 0.000 | 0.000 |
| Dibromochloromethane | | | 0.000 | | 0.000 | | 0.000 |
| 1,1,2-Trichloroethane | 10 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 0.001 |
| Benzene | 1 | 0.265 | 0.003 | 0.134 | 0.001 | 0.547 | 0.005 |
| trans-1,3-Dichloropropene | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2-Chloroethylvinyl ether | | | 0.000 | | 0.000 | | 0.000 |
| Bromoform | 0.5 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 4-Methyl-2-pentanone | 50 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2-Hexanone | 5 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tetrachloroethene | 50 | 0.001 | 0.000 | 0.022 | 0.011 | 0.001 | 0.001 |
| 1,1,2,2-Tetrachloroethane | 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Toluene | 100 | 0.004 | 0.004 | 0.002 | 0.002 | 0.012 | 0.012 |
| Chlorobenzene | 10 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ethylbenzene | 100 | 0.001 | 0.001 | 0.001 | 0.001 | 0.003 | 0.003 |
| Styrene | 50 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Xylene (total) | 100 | 0.003 | 0.003 | 0.002 | 0.002 | 0.013 | 0.013 |
| Hexane | | | 0.002 | | 0.009 | | 0.016 |

## ATTACHMENT 8A

**Repository Status Report: March, 1994**

## REPOSITORY STATUS REPORT: MARCH, 1994

**At the Rice University Library...**

1. Remedial Investigation Report April, 1985

2. Remedial Investigation Report June, 1986 (Updated from April, 1985)

3. Remedial Investigation Report Volume I, April, 1985

4. Remedial Investigation Report Appendices, Volume I, February, 1986 (Revised June, 86)

5. Remedial Investigation Report Appendices, Volume II, April, 1985

6. Remedial Investigation Report Appendices, Volume II, February, 1986 (Revised June, 1986)

7. Remedial Investigation Report Appendices, Volume III, February, 1986

8. 1986 Field Investigation Hydrology Report, December 19, 1986

9. 1986 Field Investigation and Supplemental Remedial Investigation Report Volume I, December, 1986

10. 1986 Field Investigation and Supplemental Remedial Investigation Report French Limited Site Volume II, Appendices December, 1986

11. Feasibility Study Report, March 1987

12. Feasibility Study Report, March 1987, Executive Summary
    P. ii-iv Missing
    P. ix-xiv Missing
    Pages 1-5 thru 1-13 Missing
    No Appendix F - Component Description and Costing Information
    (Only Appendix D with Numbered Pages)

13. French Limited Site Focused Feasibility Study (May 1987)

14. Endangerment Assessment Report February, 1987

15. Endangerment Assessment Report April 1987 (Updated from February, 1987)

16. Public Health Assessment for French Limited March 30, 1993 from U.S. Department of Health and Human Services

17. Proposed In Situ Biodegradation Demonstration French Limited Site Phase III, April, 1987

18. In Situ Biodegradation Demonstration Report Volume I Executive Summary, October 30, 1987
    - Table's Not Page Numbered
    - Section 1 Pages 1-1 Missing
    - Section 2 Pages 2-1 Missing
    - Section 3, Two Pages 3-1 with First Page Crossed Out
    - Section 3, Page 3.5 Shaping the Dike Before Air Sparger Installation Missing
    - Section 4, Two Pages 4-12 with First Page Crossed Out
    - Section 4, Page 4-3 is Missing
    - Section 5, Two Pages 5-31 with First Page Crossed Out
    - Section 5, Two Figure 5-4 with First Page Crossed Out
    - Section 7, Two Pages 7-6 with First Page Crossed Out and Second Page with Correction Written in second to Last Paragraph
    - Section 8, Two Pages 8-1 with First Page Crossed Out
    - Section 8, Two Pages 8-3 with First Page Crossed Out
    - Section 9, Two Pages 9-7 with First Page Crossed Out
    - Section 10, Two Pages 10-3 with First Page Crossed Out
    - Section 10, Two Pages 10-7 with First Page Crossed Out
    - Section 10, Two Pages 10-9 with First Page Crossed Out

19. In Situ Biodegradation Demonstration Report Volume II, October 30, 1987 (Revised February 1, 1988 at Site only)

20. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume I, November 30, 1987

21. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume II, November 30, 1987 + Appendices

22. In Situ Biodegradation Demonstration French Limited May/June 1988 Monthly Report, Equipment Evaluation Phase IV

23. In Situ Bioremediation Demonstration French Limited July, 1988 Monthly Report, Equipment Evaluation Phase IV

24. In Situ Biodegradation Demonstration Supplemental Report French Limited Site, Volume IV November 30, 1987 + Appendicies

25. Summary of Remedial Alternative Selection 1988

26. Declaration for the Record of Decision 1988

27. Results of the French Limited Task Group Survey (Goldman and Company) April, 1987

28. Goldman Public Relations Clipping Report

29. Record of Public Meeting Regarding Remedial Investigation and Feasibility Study (5-21-87)

30. Record of Public Meeting Regarding Remedial Investigation and Feasibility Study (2-11-88) (Updated from June 21, 1987)

31. Consent Decree between the Federal Government and the FLTG

32. French Limited Superfund Site Community Relations Revised Plan August, 1989 - Jacob's Engineering

33. Laboratory Evaluation of Biodegradation at the French Limited Site

34. Field Evaluation of Biodegradation at the French Limited Site (Phase II) Volume I

35. Bioremediation Facilities Design Report Volume II of IV Appendices, Reports and Calculations (March 20, 1991)

36. Bioremediation Facilities Design Report Volume III of IV Appendix E - Design Specifications (March 20, 1991)

37. Bioremediation Facilities Design Report Volume IV of IV - Air Monitoring, March 20, 1991
    Section 3.0 Page 3-7 Missing

38. Remedial Action Plan Volume I - April, 1990
    1-2-24 Missing Phase 1B
    Shallow Subsoil Boring Locations
    1-2-50 Plate 1 Missing

39. Remedial Action Plan Volume I - September, 1990 (Updated from April, 1990)
    I-E 2-2 Missing from Appendix E (Removed from Site to Copy)

40. Remedial Action Plan Volume II Quality Assurance April, 1990

41. Remedial Action Plan Volume II Quality Assurance September, 1990 (Updated from April 1990) Revised June 3, 1991

42. Remedial Action Plan Volume II Quality Assurance June, 1990
Appendix A - Quality Assurance Sampling Procedures and
Appendix B - Analytical Methods - B.1 - B.53, September 22, 1989
Revised September 28, 1990

43. Remedial Action Plan Volume III - Health and Safety, July 20, 1990
Contents Start at Page 17 of 28
Pages 21 and 22 of 28 Missing in Contents

44. Remedial Action Plan Volume IV - Spill and Volatile Organic Release Contingency Plan (April 6, 1990)

45. Remedial Action Plan Volume V - Shallow Aquifer and Subsoil Remediation Process Design, May, 1990
Page v.i.3 Missing
Section 7.0 Page 1 of 17 Mismarked (11)
Section C, Page between 5 and 6 Blank

46. Remedial Action Plan Volume V - Shallow Aquifer and Subsoil Remediation Process Design, July 20, 1990, (Updated from May, 1990)

47. Hydrogeologic Characterization Report, March 1989

48. Hydrogeologic Characterization Report - Appendices, March 1989

49. December, 1987 French Limited Monthly Report Equipment Evaluation Phase IV

50. January, 1988 Monthly Report Equipment Evaluation Phase IV

51. Supplemental Biodegradation Equipment Evaluation French Limited Site - Phase IV, September 26, 1988

52. 1988 Equipment Evaluation Phase IV Report French Limited Site: Volume I, February 1, 1990

53. 1988 Equipment Evaluation Phase IV Report French Limited Site: Volume II, February 1, 1990

54. Site Safety and Health Plan French Limited Site - Phase III, April 1987 (Revision 2)

55. San Jacinto River May 19, 1989 Flood Event Report, June 1989

56. Post San Jacinto River May 1989 Flood Event Soils and Water Analysis Program - Volume I, August 16, 1989

57. Post San Jacinto River 1989 Flood Event Soil and Water Analysis Program Volume II Appendix A

58. Post San Jacinto River 1989 Flood Event Soil and Water Analysis Program Volume III Appendix A, August 16, 1989

59. 1988 Slough Investigation Report French Limited Site, October 1988 (2 Copies)

60. Flood and Migration Control Wall Design Report, August 16, 1989

62. Flood and Migration Control Wall Design Report Appendix C - Access Way Design, September, 1989

63. Installation Report for Flood and Migration Control Wall, January 8, 1990

64. Installation Report for Flood and Migration Control Wall Appendix A - ENSR Site Logs

65. Installation Report for Flood and Migration Control Wall Appendix B - Inspection Reports

66. Installation Report for Flood and Migration Control Wall
Appendix C - Pile Driving Inspection Report January 8, 1990

67. Flood Wall Gate Test Report French Limited Site, February 1990

68. North Pit Remediation Report French Limited Site, November 6, 1989
Figures 2-6 and 2-7 Transposed

69. Workplan for the Shallow Aquifer Pumping Tests for the French Limited Site, July 22, 1988 (2 Copies)
Extra Page (Map) Between Pages 6 and 7
Page 80 Missing

70. French Limited Site Hurricane Gilbert Preparation Report, October, 1988

71. Riverdale Lake Area Remediation Program August 15, 1989

72. In Situ Biodegradation Demonstration Phase III Quality Assurance Project Plan for French Limited Site, March, 1987

73. Addendum to Quality Assurance Project Plan for the French Limited Site In Situ Biodegradation Demonstration Phase III, February 16, 1990
Instruction 1 and 2.1 Missing Appendix A - Driller's Log
Table 2, Appendix A

74. Potable Water Well Installation Report French Limited Site, December 7, 1988

75. Bioresidue Fixation Alternatives Evaluation Report French Limited Site March 20, 1989

76. Ambient Air Impact Risk Assessment Report, May 5, 1989

77. Shallow Aquifer and Subsoil Remediation Facilities Design Report Volume I of III - Summary Report and Appendices A-H, July 1991

78. Shallow Aquifer and Subsoil Remediation Facilities Design Report Volume II of III - Appendices I-M, June 1991

79. Shallow Aquifer and Subsoil Remediation Facilities Design Report Volume III of III - Appendices N-P, June 1991

80. French Limited Remediation Design Report -
Executive Summary Bioremediation/Shallow Aquifer, July, 1991

81. January 1992 Monthly Progress Report

January 1992 Monthly Progress Report Appendices A, B, C,

January 1992 Monthly Progress Report Appendices E, F

January 1992 Monthly Progress Report Appendices G

82. February 1992 Monthly Progress Report

February 1992 Monthly Progress Report Appendices A, B,

February 1992 Monthly Progress Report Appendices C 1 and C 2

February 1992 Monthly Progress Report Appendices D, E

83. July 1992 Monthly Progress Report with Appendices A, B

84. December 1992 Monthly Progress Report

December 1992 Monthly Progress Report and Appendices A, B

87. March 1993 Monthly Progress Report

88. April 1993 Monthly Progress Report

89. Black EPA Binder

90. Monthly Progress Report May, 1993

91. Monthly Progress Report June, 1993

92. Monthly Progress Report July, 1993

93. Monthly Progress Report August, 1993

94. Monthly Progress Report September, 1993

95. Monthly Progress Report October, 1993

96. Monthly Progress Report November, 1993

97. Monthly Progress Report December, 1993

98. Monthly Progress Report January, 1994

99. Monthly Progress Report February, 1994

**At the Crosby library...**

2. Remedial Investigation Report - June, 1986
   12-1 and 12-2 Not in Table of Contents

3. Remedial Investigation Volume I - Appendices 4-85

4. Remedial Investigation Appendices Volume I June, 1986 Revised from Feb. 1986
   Page J-7 to J-14 Missing
   Resource E Tabs Analytical Report Worksheet, Page 6 Missing

5. Remedial Investigation Volume II - Appendices 4-85

6. Remedial Investigation Appendices Volume II June, 1986 Revised from Feb. 1986
   Tab 6, Soil Boring Logs B-12, B-13, B-15, B-16, B-17, B-31, B-32 Missing

7. Remedial Investigation Appendices Volume III February, 1986
   Pages 1 and 2 of 10 Res. Engr Tab Missing
   Analytical Report Worksheet 7-8-9-10 Missing
   Pages 1 and 2 of 6 Missing
   Tab 9 H 1-8 Missing, H 11-19 Missing, Page 1 of 10 Missing,
   Page 3 Worksheet Missing
   Tab 10 H 1-3 Missing, Page 3-6 of 6 Missing, Page 1-6 Missing
   Tab 12 Page 2-10 of 10 Missing

8. 1986 Field Investigation Hydrology Report, December 19, 1986

9. 1986 Field Investigation and Supplemental Remedial Investigation Report Volume I, December, 1986

10. 1986 Field Investigation and Supplemental Remedial Investigation Report Volume II, Appendices, December 1986

11. Feasibility Study Report, March 1987 (2 Copies)

13. French Limited Site Focused Feasibility Study, May 1987, Page 45 Missing

14. Endangerment Assessment Report February 1987 (2 copies)

15. Endangerment Assessment Report April 1987 (2 copies)

16. Public Health Assessment Addendum - March 30, 1993
   Missing Page 27 and 31

18. In Situ Biodegradation Demonstration Report Volume I Executive Summary October, 1987 (Revised 12-15-87)

19. In Situ Biodegradation Demonstration Report Volume II October 30, 1987

20. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume I, November 30, 1987
   Missing Supplements to 5-6 and 7 to 10

21. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume II, November 30, 1987 + Appendices
   Sample SB-9 N/A No Present or Sample Schedules

23. In Situ Biodegradation Demonstration French Limited Monthly Report for July, 1988

24. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume IV, November 30, 1987 + Appendices

27. Results of the French Limited Task Group Survey (Goldman and Company) April 1987

28. Goldman Public Relations Clipping Report

30. Record of Public Meeting Regarding Remedial Investigation and Feasibility Study (February 11, 1988) (Additional Title - Record of Public Meeting to Discuss and Accept Public Comments on the Proposed Remedy for French Limited Site)

31. Consent Decree between the Federal Government and the FLTG (2 Copies)

33. Laboratory Evaluation of Biodegradation at the French Limited Site, December 1986.

34. Field Evaluation of Biodegradation at the French Limited Site (Phase II) Volume I, March, 1987

35. Bioremediation Facilities Design Report Volume II of IV Appendices, Reports and Calculations March 20, 1991

36. Bioremediation Facilities Design Report Volume III of IV Appendix E - Design Specifications March 20, 1991

37. Bioremediation Facilities Design Report Volume IV of IV Air Monitoring, March 20, 1991

39. Remedial Action Plan Volume I September 28, 1990
    E2-2 Missing

41. Remedial Action Plan Volume II - Quality Assurance, Revised June 3, 1991

42. Remedial Action Plan Volume II - Appendix A - Quality Assurance Sampling Procedures and Appendix B - Analytical Methods - B.1 - B.53, September 28, 1990
    Page 4 of 5 Missing

43. Remedial Action Plan Volume III - Health and Safety, July 20, 1990

46. Remedial Action Plan Volume V - Shallow Aquifer and Subsoil Remediation Process Design, July 20, 1990 (2 Copies)
    Table of Contents - Pages 21 and 22 Missing
    3.0 p 7-9 Missing

47. Hydrogeologic Characterization Report, March 1989

48. Hydrogeologic Characterization Report Appendices, March 1989

49. Equipment Evaluation Phase !V Report December, I987
    Monthly Report

51. Supplemental Biodegradation Equipment Evaluation French Limited Site - Phase IV, September 26, 1988

52. 1988 Equipment Evaluation Phase IV Report French Limited Site: Volume I, February 1, 1990

53. 1988 Equipment Evaluation Phase IV Report French Limited Site: Volume II, February 1, 1990

54. Site Safety and Health Plan French Limited Site - Phase III, April 1987 (Revision 2)

55. San Jacinto River May 19, 1989 Flood Event Report, June 1989

56. Post San Jacinto River May 1989 Flood Event Soils and Water Analysis Program Volume I, August 16, 1989

57. Post San Jacinto River 1989 Flood Event Soil and Water Analysis Program Volume II, Appendix A

58. Post San Jacinto River 1989 Flood Event Soil and Water Analysis Program Volume III, Appendix A, August 16, 1989

59. 1988 Slough Investigation Report French Limited Site, October 1988 (2 Copies)
    Section 4.0 Page 1 is Correct but Plates on Following Pages
    2, 3, 4, & 5, are Not Complete.

60. Flood and Migration Control Wall Design Report, August 16, 1989

61. Flood and Migration Control Wall Design Report (Flood is spelled incorrectly on Volume Cover) + Appendix C - Access way Design September 1989

63. Installation Report for Flood and Migration Control Wall January 8, 1990

64. Installation Report for Flood and Migration Control Wall
Appendix A - ENSR Site Logs

65. Installation Report for Flood and Migration Control Wall
Appendix B - Inspection Reports

66. Installation Report for Flood and Migration Control Wall
Appendix C - Pile Driving Inspection Report January 8, 1990

67. Flood Wall Gate Test Report French Limited Site, February 1990

68. North Pit Remediation Report French Limited Site, November 6, 1989

69. Workplan for the Shallow Aquifer Pumping Tests for the French Limited Site, July 22, 1988 (2 Copies)
(Additional Title - Pumping Test Program for Shallow Alluvial Aquifer Zone)
Pages 79-80 Missing

70. French Limited Site Hurricane Gilbert Preparation Report October, 1988

71. Riverdale Lake Area Remediation Program, August 15, 1989

73. Addendum to Quality Assurance Project Plan for the French Limited Site In Situ Biodegradation Demonstration Phase III, February 16, 1990

74. Potable Water Well Installation Report French Limited Site, December 7, 1988

75. Bioresidue Fixation Alternatives Evaluation Report French Limited Site March 20, 1989

76. Ambient Air Impact Risk Assessment Report, May 5, 1989

77. Shallow Aquifer and Subsoil Remediation Facilities Design Report Volume I of III - Summary Report and Appendices A-H, July 1991

78. Shallow Aquifer and Subsoil Remediation Facilities Design Report Volume II of III - Appendices I-M, June 1991

79. Shallow Aquifer and Subsoil Remediation Facilities Design Report Volume III of III - Appendices N-P, June 1991

80. French Ltd. Remediation Design Report Executive Summary
Bioremediation Shallow Aquifer July 1991

81. January 1992 Monthly Progress Report

    January 1992 Monthly Progress Report Appendices A-B-C

    January 1992 Monthly Progress Report Appendix D

    January 1992 Monthly Progress Report Appendices E-F

    January 1992 Monthly Progress Report Appendix G

82. February 1992 Monthly Progress Report

    February 1992 Monthly Progress Report Appendices A-B

    February 1992 Monthly Progress Report Appendices C-1 and C-2

    February 1992 Monthly Progress Report Appendices D-E

83. July 1992 Monthly Progress Report Appendices A-B

84. December 1992 Monthly Progress Report

    December 1992 Monthly Progress Report Appendices A-B

85. January 1993 Monthly Progress Report

86. February 1993 Monthly Progress Report

87. March 1993 Monthly Progress Report

88. April 1993 Monthly Progress Report

90. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume III, November 30, 1987 + Appendices
    Lab Report - Page 138 Missing
    Pages 1280 to 1287 Missing (Missing at Site)

90a. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume V + Appendices, November 30, 1987

90b. In Situ Biodegradation Demonstration French Limited Monthly Report for January, 1988 or January Monthly Report Equipment Evaluation Phase IV.

91. French Limited Administrative Records Index

92. ARCS Remedial Activities at Uncontrolled Hazardous Waste Sites in the Zone of Regions VI, VII, VIII

Volume I Cell 2 Remediation Verified Report FLTG

Volume II Cell 2 Remediation Verified Report FLTG

Volume III Cell 2 Remediation Verified Report FLTG

Volume IV Cell 2 Remediation Verified Report FLTG

Volume V Cell 2 Remediation Verified Report FLTG

Volume VI Cell 2 Remediation Verified Report FLTG

93. Monthly Progress Report May, 1993

94. Monthly Progress Report June, 1993

95. Monthly Progress Report July, 1993

96. Monthly Progress Report August, 1993

97. Monthly Progress Report September, 1993

98. Monthly Progress Report October, 1993

99. Monthly Progress Report November, 1993

100. Monthly Progress Report December, 1993

101. Monthly Progress Report January, 1994

102. Monthly Progress Report February, 1994

BROWN FOLDERS:

1. Administrative Record Index
Administrative Record 2-28-84
Technical Comments on Remediation Investigation Report 2-84
Supplemental Investigation - Resource Engr. 1-84
Administrative Record 3-9-84

2. Miscellaneous Small EPA Newsletters/Reports

3. Supplementary Investigative - Resource Engr. 5-84 (2 Copies)
Administrative Record 8-31-84
Technical and Regulatory concepts for In-Place Closure - Resource Engr. 9-84
Administrative Record 10-29-84 - 1-22-85
Region IV Environmental Protection Agency and Texas Department of Water Resources - Resource Engr. 2-85

4. Administrative Record 2-4-85

5. Administrative Record 4-8-85 - 11-26-85
Deep Aquifer Technical Report 12-3-85
Quality Assurance Program for FLTG Phase III
1985 Field Service Report 1-86
1985 Field Service Appendices 1-86
Administrative Record 2-14-86 - 4-4-86

6. Administrative Record 4-1-86
Remedial Investigation Report Appendices Volume II 4-86

7. Administrative Record 4-1-86

8. Administrative Record 5-8-86 - 5-12-86
Remedial Investigation Report - Resource Engr. 6-86 (Duplicate)
Administrative Record 6-1-86

Laboratory Evaluation of Biodegradation at French Limited Site
1986 Field Investigation French Limited Site 12-86
Applied Hydrology Assc. Inc.
Administrative Record 1-5-87
Endangerment Assessment Report French Limited Site 2-87
Texas Water Commission Feasibility Study Report 3-87

9. Administrative Report 3-11-87 - 3-25-87
Quality Assurance Project Plan for French Limited Site
In Situ Biodegradation Demonstration Phase II 3-87
Remedial Planning Activities at Selected Uncontrolled Hazardous Waste Sites Zone II EPA
Administrative Report 4-1-87
Proposed In Situ Biodegradation Demonstration French Limited Site Phase III 4-87
Administrative Report 4-7-87

10. Administrative Report 4-15-87 - 5-I-87
French Limited Focused Feasibility Study, ERT 5-87
Administrative Report 5-21-87 - 7-2-87
Revised Field Evaluation of Biodegradation at French Limited Site Phase II Vol. I

11. Administrative Report 7-20-87 - 11-23-87
In Situ Biodegradation Demonstration Report Vol. I Executive Summary 10-87
French Limited Site Work Plan Vol. I Project Activities and Sample Plan - Lockwood, Andrews and Newman, Inc.
Administrative Report Undated Documents 000122-000134

MICROFICHE FIELD REPORTS 1988

During the month of March, the status of both libraries has been reviewed and the above information found to be accurate.

# 9.0 WETLANDS RESTORATION

## 9.1 Summary of Activities and Progress

Completed detailed evaluation and comparison of the four high potential sites. The four sites are:

1. Barrett I
2. Wallisville Road
3. Brownwood
4. San Jacinto Monument

The detailed comparison of the four sites included:

1. Archeological evaluation
2. Surface hydrology evaluation
3. Property availability
4. Final site ownership options
5. Conceptual design of field work
6. Wetlands generation/restoration costs
7. Site maintenance costs and requirements

Field sampling and testing was completed.

Reviewed project data, status, and issues with the agency review committee, and there were no unresolved issues.

Presented evaluation of four sites to the agency review committee. Presented more detailed evaluation of the final two sites (Brownwood and San Jacinto Monument) to the agencies, and recommended the Brownwood site as the best site to create high quality, sustainable wetlands.

### 9.2 Problem Areas and Solutions

| Problem | Recommended Solution |
|---|---|
| Crosby opposition to selection of Brownwood. | Explain selection process; respond to questions and concerns; maintain agency support. |

### 9.3 Problems Resolved

Risk factors for the final four site.

Conceptual location for Brownwood site.

### 9.4 Deliverables Submitted

Phase III site evaluation report.

### 9.5 Upcoming Events and Activities

Complete site evaluation and selection report.

Complete detailed design plan for Brownwood.

Develop agreement between FLTG and Baytown.

Develop detailed design and cost estimate for Brownwood.